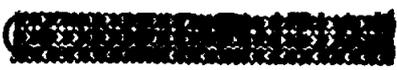


5868



MSC-06804  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

# APOLLO 16 COMMAND MODULE ONBOARD VOICE TRANSCRIPTION

Classification changed to (U)  
By authority of JSC Security Classification Officer  
Date 11-9-73 - 2/9/78 - Sally Hutto

RECORDED ON THE DATA  
STORAGE EQUIPMENT (DSE)

JUNE 1972

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GROUP 4  
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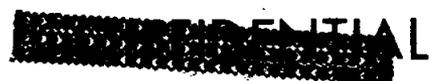


MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

INDEXING DATA  
DATE \_\_\_\_\_ OPR \_\_\_\_\_

# \_\_\_\_\_ T \_\_\_\_\_ PGM \_\_\_\_\_ SUBJECT \_\_\_\_\_ SIGNATOR \_\_\_\_\_ LOC \_\_\_\_\_  
APD (Title) MSC 080-21



UNCLASSIFIED

iii

SECURITY CLASSIFICATION

The material contained herein has been transcribed into a working paper in order to facilitate review by interested MSC elements. This document, or portions thereof, may be declassified subject to the following guidelines:

Portions of this document will be classified CONFIDENTIAL, Group 4, to the extent that they: (1) define quantitative performance characteristics of the Apollo Spacecraft, (2) detail critical performance characteristics of Apollo crew systems and equipment, (3) provide technical details of significant launch vehicle malfunctions in actual flight or reveal actual launch trajectory data, (4) reveal medical data on flight crew members which can be considered privileged data, or (5) reveal other data which can be individually determined to require classification under the authority of the Apollo Program Security Classification Guide, SCG-11, Rev. 1, 1/1/66.

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v

## INTRODUCTION

This document is the transcription of the Apollo 16 flight crew communications as recorded on the command module (CM) data storage equipment (DSE) and subsequently transmitted (dumped) to Manned Space Flight Network stations. Magnetic tapes containing dumped voice and onboard-recorded Apollo elapsed time (AET) were forwarded to the NASA Manned Spacecraft Center, Houston, Texas. Transcription of these tapes was managed by James L. Gibbons, Test Division, Apollo Spacecraft Program Office, to whom inquiries regarding this document should be referred.

The transcript is divided into three columns — time, speaker, and text. The time column consists of four two-digit pairs representing days, hours, minutes, and seconds (e.g., 04 22 34 14). The speaker column indicates the source of a transmission; the text column contains the verbatim transcript of the communications.

The time used by Mission Control Center (MCC) and indicated as ground elapsed time (GET) in the Flight Plan may be updated to the spacecraft and MCC computers and to the telemetry down-link pulse-code-modulated bitstream or other time-recording devices. This GET updating will be performed only to correct significant changes in Flight Plan time occurring as the result of delayed lift-off, midcourse corrections, or spacecraft burn-time differences (trajectory dispersions).

Should these updates occur, the AET (the true mission-elapsed time) may not agree with Flight Plan and MCC times. Users of this transcript are cautioned to apply the appropriate time-update deltas for the updated periods.

Speakers in the transcript are identified as follows:

### Spacecraft:

CDR	Commander	John W. Young
CMP	Command module pilot	Thomas K. (Ken) Mattingly II
LMP	Lunar module pilot	Charles (Charlie) M. Duke, Jr.
SC	Unidentifiable crewmember	
MS	Multiple speakers	

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## Mission Control Centers:

CC            Capsule communicator (CAP COMM)

LCC          Launch control center

In the text, a series of three dots (...) is used to designate those portions of the communications that could not be transcribed because of garbling. One dash (-) is used to indicate a speaker's pause or a self-interruption. Two dashes (- -) are used to indicate an interruption by another speaker or a point at which a recording was abruptly terminated. Words given unusual emphasis by the speaker are underlined.

The Apollo 16 mission was flown April 16 to 28, 1972; lift-off occurred at 17:54:00.57 G.m.t. (12:54:00.57 p.m. e.s.t.) on April 16. The CM was designated Casper and the lunar module was called Orion.

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## DAY 1

15, 14, 13, 12, 11, 10, 9, 8, 7, 6 -  
IGNITION, 4, 3, 2, 1 -  
LIFT-OFF.  
Man, we're on our way!  
Yaw program. ... clear.  
Clear the tower.  
Roger; clear the tower.  
You go.  
... program.  
Go! You - -  
... roll. You have good thrust in all five.  
Roger.  
Pitch program.  
It sure ain't what I expected.  
Me, either. It's like a freight train.  
That's what everyone said. Quiet as ...  
Man, we're right on.  
Man, look at this thing go! What are the g's, John?  
One and a half.  
Okay.  
Through 10K. Must be coming up on a little q here.  
Tower [sic] system's relieving - Tower's rel -  
Cabin's relieving - -

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Day 1

00 00 01 00 CC Stand by for Mode I Bravo -  
00 00 01 02 CC MARK, I Bravo.  
00 00 01 04 CMP I Bravo.  
00 00 01 05 LMP Cabin's relieving.  
00 00 01 06 CC ... feet wet now, 16.  
00 00 01 08 CDR Roger.  
00 00 01 13 LMP Man, that was beauteous! ... - -  
00 00 01 15 CDR ... g.  
00 00 01 17 LMP MASTER ALARM.  
00 00 01 18 CMP Okay, that one's ... - -  
00 00 01 19 LMP Okay, that's just ... module.  
00 00 01 20 CDR No sweat.  
00 00 01 21 LMP Okay. Okay.  
00 00 01 29 CDR Coming up on max q, Charlie.  
00 00 01 31 LMP Okay.  
00 00 01 34 CMP Okay. Trajectory is good.  
00 00 01 37 CDR Two and a half g's.  
00 00 01 46 CC Okay; you're through max q, and everything looks good.  
00 00 01 49 CMP It does indeed. I believe this baby's gonna go up.  
00 00 01 57 CC Stand by for Mode I Charlie.  
00 00 01 59 CDR Roger.  
00 00 02 00 CC MARK, I Charlie.  
00 00 02 01 CMP Okay. Manual.  
00 00 02 02 CDR Right.

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Day 1

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Page 3

00 00 02 03 CMP Ready?

00 00 02 04 CDR Yeah.

00 00 02 05 CMP Those are done. EDS is manual. And that - that baby is gonna unload.

00 00 02 10 CDR It sure is.

00 00 02 12 LMP Mm-hmm.

00 00 02 13 SC (Laughter)

00 00 02 18 CMP Stand by.

00 00 02 19 CDR ... inboard shutdown.

00 00 02 22 CC ... inboard. You're GO for staging.

00 00 02 24 CDR Right now, that ... only ... for staging. Watch it.

00 00 02 27 LMP Okay.

00 00 02 28 CMP All set.

00 00 02 29 LMP I'm all set.

00 00 02 30 CDR Okay, I'll count you down to it. 30, 31 ... 32. Those are good numbers, Ken?

00 00 02 41 CMP That should be.

00 00 02 42 CDR ...

00 00 02 43 LMP Hey, yeah, there's (laughter) ... - -

00 00 02 44 CMP Man!

00 00 02 45 LMP Whoo!

00 00 02 46 CMP Look at that.

00 00 02 47 CDR Staging.

00 00 02 48 CMP Oh, man.

00 00 02 49 CDR Okay, ignition on the S-II.

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00 00 02 51 CC ...

00 00 02 54 LMP Boy, it's beautiful. Mmm.

00 00 02 56 CMP Is that ...?

00 00 03 00 CC ... GO on all five on the S-II.

00 00 03 02 CMP Wasn't even showing that (laughter).

00 00 03 04 LMP We got -

00 00 03 05 CMP Okay, it's -

00 00 03 07 LMP Comm's good.

00 00 03 08 CMP Coming back - 3 minutes.

00 00 03 09 LMP Mmm.

00 00 03 11 CDR Nine, 10, 11, 12 -

00 00 03 14 CMP Want me to go on time, John?

00 00 03 15 CDR Second ... SEP light's out. Yeah, go on time.

00 00 03 17 CMP All right. I got the register - -

00 00 03 18 CC ...

00 00 03 19 CMP - - set. Here we go.

00 00 03 21 CDR Tower jettison.

00 00 03 22 LMP There she goes.

00 00 03 23 CC Roger. And we confirm your skirt SEP. You're Mode II now.

00 00 03 27 CDR Roger. Mode II.

00 00 03 28 CMP Okay, you're Mode II. Look - -

00 00 03 30 LMP Evaporators on?

00 00 03 31 CMP Oh, Charlie, look at that horizon. Can you see - -

00 00 03 32 CDR Grab ...

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00 00 03 33 LMP Yeah.

00 00 03 34 CDR Okay. Okay, what - how's the steering?

00 00 03 36 CMP She's doing fine, John.

00 00 03 37 CDR Yeah; 3.4.

00 00 03 41 CC ... has converged. CMC is GO.

00 00 03 43 CDR Roger.

00 00 03 46 CMP Four minutes. We should be sitting at 21 degrees.

00 00 03 50 CDR That is beautiful.

00 00 03 52 LMP Man, I'll say - -

00 00 03 53 CMP You looking?

00 00 03 54 LMP - - ... there.

00 00 03 55 CDR Okay.

00 00 03 56 CMP You're right.

00 00 03 57 LMP I'm going to look out a little bit.

00 00 03 58 CDR Okay, we're only pulling three-quarters of a g.

00 00 04 02 CMP/LMP ... - -

00 00 04 03 CC 16, Houston. Four minutes. Everything looks great down here.

00 00 04 05 CDR Roger. It looks good up here, too.

00 00 04 08 LMP Hey, Gordy, you ought to see that horizon. Just gorgeous.

00 00 04 11 CC ...

00 00 04 12 CMP - - ... that's ...?

00 00 04 13 LMP Yeah.

00 00 04 19 CMP Look at that stuff out your left window. What the heck is that?

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00 00 04 22 CDR That's just stuff from the tower.

00 00 04 24 CMP Going with us?

00 00 04 25 CDR Yeah.

00 00 04 27 CMP 04:30. Just a little low on the - the altitude. Velocity's looking good.

00 00 04 38 CDR 04:30. Steering is 19 degrees. Looking good.

00 00 04 43 CMP Okay. Let's see - you got - How about let's clean up the rest of the things we didn't do, like attitude, the rate command.

00 00 04 52 CDR RATE COMMAND.

00 00 04 54 CMP And ALPHA to Pc.

00 00 04 56 CDR Pc. Turn on our gimbal motors here at 6 minutes, Charlie.

00 00 05 00 LMP Okay. I'm ready; about a minute to go.

00 00 05 02 CMP Well, you even remembered the - you remembered to do the water, Charlie.

00 00 05 06 LMP Yeah, I got the water and everything going.

00 00 05 07 CMP We ought to give you an award for that.

00 00 05 10 LMP Man, I was watching those gages at S-IC and they were really jumping. That steam pressure the secondary read out. Man, was that a ride!

00 00 05 24 CDR It was that staging that's thrilling, ain't it?

00 00 05 25 CMP You ain't kidding! I was real glad someone warned us.

00 00 05 27 CC 16, Houston. Times are nominal, level sense will be 8 plus 37, and cut-off at 9 plus 19.

00 00 05 36 CDR Roger.

00 00 05 40 CMP You'll get a little buzz now.

00 00 05 51 CDR Coming up on 6 minutes - -

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00 00 05 52 CC ... by for S-IVB to COI capability.

00 00 05 56 CC MARK. You have it now.

00 00 05 57 CDR Roger. Okay, Charlie.

00 00 06 02 LMP Okay, stand by. Go ahead on the ones.

00 00 06 04 CDR PITCH 1 is coming on -

00 00 06 05 CDR MARK. YAW 1. Did you get it?

00 00 06 09 LMP No, I couldn't see it. Okay. Go ahead.

00 00 06 11 CDR PITCH 1 is on -

00 00 06 12 CDR MARK.

00 00 06 13 LMP Okay.

00 00 06 14 CDR YAW 1 is on -

00 00 06 15 CDR MARK.

00 00 06 16 LMP Good.

00 00 06 17 CDR PITCH 2 is on -

00 00 06 18 CDR MARK.

00 00 06 19 LMP Good one.

00 00 06 20 CDR YAW 2 is on -

00 00 06 21 CDR MARK.

00 00 06 22 LMP Good one.

00 00 06 23 CDR Okay.

00 00 06 24 CMP Check your GPIs?

00 00 06 25 CDR Yeah.

00 00 06 26 LMP Okay. You can't see that on the fuel cells, Ken.

00 00 06 28 CMP I just noticed that.

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00 00 06 29 LMP It's all on the batteries here.

00 00 06 31 CMP Yeah. I saw that. That's really strange.

00 00 06 33 LMP Yeah.

00 00 06 34 CDR Okay. Got -

00 00 06 39 LMP How's the trajectory?

00 00 06 40 CDR Got a minute to go to inboard shutoff.

00 00 06 42 CMP Man, it looks like a champ. ... get OMNI Delta.

00 00 06 44 CC - - by for S - -

00 00 10 23 LMP Everything's in great shape up here, you guys.

00 00 10 25 CMP Okay, we're gonna back this guy up, and we've got - -

00 00 10 28 CC 16, Houston. You're GO for orbit. Predicted cut-off, 11 plus 49.

00 00 10 34 CDR Roger; 11:49.

00 00 10 36 CMP Okay, now, you're gonna shut this guy down with the hand controller if it overspeeds?

00 00 10 39 CDR Yep. But we're going to see 20 - -

00 00 10 40 CMP That's not for long.

00 00 10 41 CDR - - 25.6.

00 00 10 52 CMP That's right. We want - Let's see. 25.6 is normal, so we go to 25.7 to back it up.

00 00 10 56 CDR Right.

00 00 11 07 CMP Eleven minutes. Look at that. Minus 60, and it says it's gonna be 69. It's got a little buzz of its own.

00 00 11 15 CDR Yeah.

00 00 11 16 LMP Mm-hmm. Here's another one. A little rumble.

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00 00 11 17 CMP Yeah. Same frequency.

00 00 11 19 CDR Okay, it's 11:25 - -

00 00 11 21 LMP 11:20.

00 00 11 23 CDR - - 11:20.

00 00 11 25 CDR Okay, 25.1, 25.2, 25.3. Look at it pitch back up and kill that altitude. 25.4 - -

00 00 11 41 LMP Should have about 10 seconds - to shutdown.

00 00 11 43 CDR 1, 2, 3, - 5.5.

00 00 11 47 CMP SHUTDOWN.

00 00 11 48 LMP Look at that ... - -

00 00 11 49 CMP SECO.

00 00 11 50 CDR Right on!

00 00 11 51 CMP Oh, ... - -

00 00 11 52 LMP Look at ...

00 00 11 53 CDR Here we are!

00 00 11 54 CMP I'm turning off the pyro arms, you guys.

00 00 11 55 LMP Okay. GIMBAL MOTORS. Let's go - GIMBAL MOTORS.

00 00 11 59 CMP Okay.

00 00 12 00 LMP Go ahead.

00 00 12 01 CMP PITCH 1 is coming OFF.

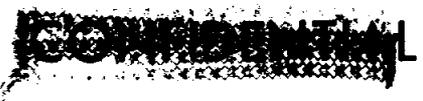
00 00 12 02 LMP Okay, go.

00 00 12 03 CMP YAW 1 is coming OFF.

00 00 14 51 LMP - - ... breaker and install the COAS. Okay, we just - -

00 00 14 54 CMP ... O<sub>2</sub>.

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00 00 14 56 LMP That's okay. I just pushed the breaker in.

00 00 14 57 CMP Okay.

00 00 14 58 LMP Okay, Gordy; we're on page 2-11 down through - we're getting to installing the COAS. That MA was the transducer - ECS.

00 00 15 07 CC ..., Charlie.

00 00 15 09 LMP Oh, look how easy it is! Okay, service module - -

00 00 15 12 CDR Charlie, did you do that?

00 00 15 13 LMP Yeah, I did that, but I'm sorry (laughter). Okay, WASTE H<sub>2</sub>O/DUMP; FUEL CELL's going NORMAL; PURGE LINE HEATER's on.

00 00 15 26 CDR (Laughter) Did you -

00 00 15 32 LMP Look at those - little -

00 00 15 35 CDR Yeah, you - -

00 00 15 36 LMP Let's see, ... got the torquing angles. You got - -

00 00 15 37 CDR And I made it up with a clean window.

00 00 15 39 LMP Sure. Yeah.

00 00 15 41 CDR Whoops. MA again.

00 00 15 42 LMP No, I'm testing.

00 00 15 43 CDR Yeah?

00 00 15 44 LMP Yeah. Okay, going to COMMAND MODULE - -

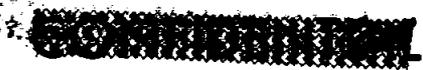
00 00 15 46 CMP But you - -

00 00 15 47 LMP - - you get an MA?

00 00 15 48 CMP Yeah.

00 00 15 49 LMP Listen to that tone. Barely audible.

00 00 15 50 CMP Yeah.



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00 00 15 51 CDR Shoot. I don't have any trouble hearing it.  
HATCH GEAR BOX is LATCH; ACTUATOR HANDLE is going  
to neutral ... - -

00 00 15 57 CMP Oh, John - -

00 00 15 58 CDR Excuse me there, Charlie.

00 00 15 59 CMP I'm gonna leave the nitrogen in the - in the hatch.  
We're gonna pump that when we get back. I talked  
to the guys about that.

00 00 16 08 CDR Okay.

00 00 16 09 CMP They said that'd be okay.

00 00 16 11 CDR Fine.

00 00 16 12 CMP Okay, and I've got a note in the Flight Plan that  
says we're to vent it later on.

00 00 16 16 LMP Okay, we just had loss of comm.

00 00 16 19 CMP Okay. Ohhh.

00 00 16 21 CDR Ohhh. Is that ever nice! Look at that ... - -

00 00 16 24 LMP Look at that view out there, you guys!

00 00 16 27 SC (Laughter)

00 00 16 28 CDR Oh, is that ever pretty.

00 00 16 30 LMP Hey, it's b - blacker than pitch out this window 5.

00 00 16 33 CDR Supposed to be, Charlie. That's the rule of it.

00 00 16 35 LMP ... Yeah.

00 00 16 36 CMP Okay, I got your VERB 83 up there. I don't know  
what you're gonna do with it. I ... just buy it  
for you.

00 00 16 40 CDR That really is nice, that VERB 83 (laughter).

00 00 16 43 LMP Okay, I'm gonna start in on the - -

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**CONFIDENTIAL**

Day 1

00 00 16 46 CMP Okay, I've got eight grays. That all looks like a champ. Okay, cabin pressure's good.

00 00 16 52 CDR If you'll get me a camera, I'll take a nice picture.

00 00 16 55 CMP I'll go get those in just a minute, babe.

00 00 16 57 CDR Okay.

00 00 16 58 LMP It looks like those clouds are right on top - right down there. You could reach out and touch them.

00 00 17 01 CDR They are. We're coming up over the Africa, Charlie, and - -

00 00 17 04 LMP Where's Africa? I don't see it.

00 00 17 07 CDR Well - -

00 00 17 08 LMP Is it - maybe I can just look - -

00 00 17 09 CDR This is just - these little old - It's clouds like this or like it - -

00 00 22 21 LMP Okay, I'm gonna unhook and stow - unstow the helmet bags.

00 00 22 24 CDR Hang on a second. Let me get that circuit breaker for you.

00 00 22 37 CC ..., Houston. Data is back now good, and everything looks fine as we come up 20 seconds to LOS. We'll see you at Carnarvon at 52:39.

00 00 22 47 CDR Roger; 52:39, Gordon.

00 00 22 52 CC ... the view there.

00 00 22 56 CDR All right. We're just starting to come into darkness now, and the sunset is - -

00 00 22 59 LMP Look - look at that. Look out there - -

00 00 23 00 CDR - - just as beautiful as always in this space business.

00 00 23 01 LMP (Laughter)

**CONFIDENTIAL**

00 00 23 04 CC Roger.

00 00 23 05 CDR Oh, would you look at all that. We could use some helmet stowage bags.

00 00 23 09 LMP Well, I'm getting them now.

00 00 23 10 CMP I'll get them. I'll get you the tool E down if you kind of watch your feet for a second.

00 00 23 14 CDR I don't even know - I know - What am I kicking?

00 00 23 17 CMP Well, in just a minute, it'll be me.

00 00 23 20 CDR Okay.

00 00 23 22 LMP U-1.

00 00 23 24 CDR No, they're over here, Charlie.

00 00 23 26 LMP No, they're over here. The helmet stowage bags?

00 00 23 28 CMP Yeah.

00 00 23 29 CDR You're dreaming.

00 00 23 30 LMP No. They're in U-1.

00 00 23 33 CDR Yeah, but here's the - -

00 00 23 34 CMP You got - you've got both TSBs and helmet stowage bags to get out, guys.

00 00 23 36 LMP Yeah.

00 00 23 37 CMP That's all I need.

00 00 23 38 LMP Okay.

00 00 23 39 CMP John, could you move this foot?

00 00 23 40 CDR Yeah. I don't know where I'm moving it to. (Laughter) I must - Somehow it's ... Holy smokes, it's as bad as I thought it would be.

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00 00 23 49 CMP If you put your feet down, I'll get it out of your way somehow. Hang on a second, let me get this flashlight here and see what the heck that is.  
(Laughter)

00 00 24 08 CMP In here somewhere is a tool E.

00 00 24 12 CDR In L-2?

00 00 24 13 CMP Yeah.

00 00 24 14 LMP There it is.

00 00 24 15 CDR Yeah. Is all the rest of that stuff coming out? We don't ... it.

00 00 24 18 CMP Huh?

00 00 24 19 CDR Take out one thing. (Laughter)

00 00 24 20 LMP Oh, ...

00 00 24 22 CDR I'd have sworn he was gonna unpack the whole spacecraft. (Laughter)

00 00 24 25 LMP Okay, I'm going to lower my seat.

00 00 24 26 CMP Okay, can you get it?

00 00 24 27 LMP Yeah.

00 00 24 28 CMP Okay.

00 00 24 29 LMP (Laughter)

00 00 24 32 CDR Hey, listen, you gonna have to just take it easy; we ain't really in no hurry.

00 00 24 35 LMP Yeah.

00 00 24 36 CDR Yeah, I don't - I think this is absolutely the greatest, but if you ... you torque your platform.

00 00 24 42 CMP I'm gonna keep my plat - platform way over standard.

00 00 25 02 CMP Okay. Tell you what, gang. Could you tell me that our oxygen flow looks good?

**CONFIDENTIAL**

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00 00 25 07 CDR I couldn't tell you nothing.

00 00 25 08 LMP Yeah, it does.

00 00 25 09 CMP Okay. The flow is less than 0.2 or something like that?

00 00 25 15 LMP No, it's about 0.3.

00 00 25 16 CMP Okay, and how's the cabin pressure?

00 00 25 17 LMP Cabin pressure's holding at 5 - about 5-1/2. Okay, let me get that. We have the Canaries LOS. Let me do what I'm supposed to do here at Canaries. Getting ready to flow.

00 00 25 29 CMP Okay, the emergency regs I'm going to put on. They is on BOTH.

00 00 25 37 LMP Shift ...

00 00 25 38 CDR SIMPLEX B is off.

00 00 25 43 CMP John, can you get the SUIT CIRCUIT RETURN VALVE OPEN?

00 00 25 46 CDR Yeah, I can if I can get back to it.

00 00 25 48 CMP Okay. Okay - oh, no hurry!

00 00 25 49 CDR SUIT CIRCUIT RETURN VALVE is coming OPEN. Nyuh-nuh-nuh-nuh.

00 00 26 00 CMP You got her, huh?

00 00 26 01 CDR No.

00 00 26 02 CMP I think you all - -

00 00 26 03 CDR What was that?

00 00 26 04 LMP RC - -

00 00 26 05 CMP Felt like it took a little DELTA-P.

00 00 26 07 LMP Yeah. (Cough)

~~CONFIDENTIAL~~

**CONFIDENTIAL**

00 00 26 09 CDR Here we fly in comfort though. My - is my hand controller ... - -

00 00 26 16 CMP Yeah, ... the RCS COMMAND is OFF, too.

00 00 26 18 CDR Let me do that one more time. The aft is fine, that's for sure.

00 00 26 23 CMP Yeah, there's some - there's some DELTA-V in here.

00 00 26 25 CDR Well, I'm looking out the window at the flashes.

00 00 26 27 CMP Okay, how about - -

00 00 26 30 CDR You want your old hat back?

00 00 26 32 CMP That's all right. Have you got the SUIT CIRCUIT RETURN VALVE OPEN?

00 00 26 34 CDR Yeah, the SUIT CIRCUIT RETURN VALVE is OPEN.

00 00 26 36 CMP Okay, and don't want to forget our windowshade number 5 there.

00 00 26 43 CDR Oh, yeah. Charlie - -

00 00 26 44 LMP Oh, yeah. Am I supposed to put that in right now?

00 00 26 45 CDR - - windowshade number 5.

00 00 26 46 CMP Okay, and I'm gonna - -

00 00 26 47 CDR Okay - -

00 00 26 48 CMP - - I'm gonna turn the flows off if you want to come out of the helmets and gloves.

00 00 26 51 CDR Okay, could you put my seat ... - -

00 00 26 53 LMP Have you done the main reg check?

00 00 26 54 CMP Let me see. No, we do the main regs afterwards, don't we?

00 00 26 55 LMP Oh, okay. Oh, I don't know - -

00 00 26 57 CMP Just following my checklist here.

**CONFIDENTIAL**

00 00 26 58 LMP Okay. What could make my feet want to climb up to the - -

00 00 27 02 CDR Isn't that neat?

00 00 27 03 LMP Yeah. Oh, heck.

00 00 27 07 CDR You want me to get it for you, Charlie?

00 00 27 08 CMP Five on the ... - -

00 00 27 09 LMP No, I got it, babe.

00 00 27 10 CMP Okay. You want this thing down, John, or like this?

00 00 27 13 CDR Just out of the way.

00 00 27 14 CMP Okay.

00 00 27 17 LMP (Laughter) I just had a - -

00 00 27 18 CMP I do the main regs next, Charlie. We can go ahead and take helmets and gloves off.

00 00 27 21 LMP Okay, I'm gonna get this - -

00 00 27 22 CMP And - -

00 00 27 23 LMP - - window 5 so - -

00 00 27 24 CMP Okay, if you'll tell me when you want to - when you want your flow off, I'll turn it off for you.

00 00 27 29 LMP Okay. And the window 5 cover's the one in the bag?

00 00 27 32 CDR Yeah. UB ... - -

00 00 27 33 CMP Yes, sir.

00 00 27 34 CDR ...

00 00 27 36 LMP You just st - stuff the bag back in there?

00 00 27 37 CMP (Laughter)

00 00 27 40 CDR Huh? Stuff what bag back in there?

00 00 27 43 LMP This UV camera ... - -



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00 00 27 45 CDR Oh, for gosh sakes.

00 00 27 46 LMP What?

00 00 27 47 CDR I didn't know they had a bag with it.

00 00 27 49 LMP Yeah. It's so it won't get scratched ...

00 00 27 50 CMP (Laughter) Hey, if you pull your helmet off, it's gonna go.

00 00 27 54 CDR Where does it go?

00 00 27 56 CMP Straight up. (Laughter)

00 00 27 57 CDR Did you shut your air off?

00 00 27 58 CMP Yeah, but there's still just as much DELTA-P in ... (laughter) It ... my nose, I couldn't even see it.

00 00 28 05 CDR Well, pull your glove off first.

00 00 28 07 LMP Can you - can you shut my flow off ..., Ken?

00 00 28 09 CMP Yes, sir. Here comes your flow off, now. .

00 00 28 12 LMP Okay.

00 00 28 24 LMP All these snaps.

00 00 28 30 CDR Man, that do make a difference. Okay, turn it back on, Ken.

00 00 28 33 CMP All right, just a second (laughter).

00 00 28 37 LMP I don't know what I'm kicking down there.

00 00 28 38 CMP (Laughter)

00 00 28 40 LMP Achh!

00 00 28 41 CMP (Laughter)

00 00 28 42 LMP Ah-ha!

00 00 28 43 CDR Look at that.

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00 00 28 44 LMP I can't believe it but I got her.

00 00 28 46 CDR Now, I know ... - -

00 00 28 47 LMP Here I come.

00 00 28 48 CDR - - these things.

00 00 28 49 LMP Here I come, everybody (laughter).

00 00 28 51 CDR Now - Well - well, be careful you don't hit the thrust [?] switch, Charlie.

00 00 28 53 LMP Yeah, I know it. I'm trying to avoid that, John.

00 00 28 56 CDR Course it's guarded.

00 00 29 00 CMP I keep forgetting you have to hold things.

00 00 29 04 LMP Well, for some reason, I want to float right up against the instrument panel. Maybe my - maybe it's my helium in my suit.

00 00 29 12 CDR You want your old dinner bag there, Ken?

00 00 29 14 CMP Yes, sir; thank you now.

00 00 29 16 CDR Isn't that neat?

00 00 29 17 SC (Laughter)

00 00 29 18 CDR Isn't that neat, the way stuff just floats around?

00 00 29 19 SC (Laughter) Ahhh.

00 00 29 20 CDR That's got to be the world's greatest thing.

00 00 29 23 SC (Laughter)

00 00 29 28 CDR I hate to tell you this, you guys. John's got to go potty.

00 00 29 31 LMP No, this thing won't fit (laughter).

00 00 29 34 CMP Oh, you're kidding me - I hope.

00 00 29 37 LMP I can't get out of - -

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Day 1

00 00 29 39 CMP I guess I'd better get on with that P52.

00 00 29 43 CDR Yeah, I guess - Have you jettisoned the covers, Ken?

00 00 29 45 CMP No. I - I was trying to move too slow, I think.

00 00 29 47 CDR Okay.

00 00 29 48 CMP I'm gonna do that next, and then I'll get this stuff. I'll do it.

00 00 29 51 CDR It's 29 minutes, so we got plenty of time.

00 00 29 53 CMP Yeah, it won't take long.

00 00 29 54 CDR What - what all is in the checklist to do between now and tonight? Anything?

00 00 29 58 LMP No. No, wait a minute. Let me get this thing. There you go. ... it back, naturally.

00 00 30 04 CDR Oh, come on. My goodness sakes.

00 00 30 07 LMP (Laughter)

00 00 30 08 CDR ... the optics coming around?

00 00 30 10 CMP I figured I was gonna - I stuck tool E in here where I've been keeping it. And it floats out. I thought I'd just started off the mission by losing tool E.

00 00 30 18 CDR Oh, well. There's still ... - -

00 00 30 20 LMP Okay, let me get us back on the checklist here. Okay, you've done this main - no, we haven't done the main reg check. Okay, install command module - Okay, suit circuit return. And remove helmets and stow. And mount TSBs. I don't have that done yet. But this thing has helmet bags in U-1, but that's not really true. They're over on your side, John, aren't they?

00 00 30 42 CDR Yeah, here's yours, Charlie.

00 00 30 44 CMP I - I think it's looking for TSBs out of yours, Charlie, and -

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00 00 30 48 LMP Okay, wait a minute, John.

00 00 30 49 CDR Okay, just leave it.

00 00 30 51 LMP Yeah.

00 00 30 52 CDR It won't go nowhere.

00 00 30 53 LMP I know it.

00 00 30 54 CDR That's nice.

00 00 30 56 LMP Okay, Ken. You can cut my flow off.

00 00 30 59 CMP All right; stand by. Hey, John, if you want to put your hoses on, I'll cut this baby off again for you.

00 00 31 06 CDR No, that's all right. I'll leave them where they're at.

00 00 31 07 CMP Okay.

00 00 31 08 LMP Okay, cut it back on, Ken. I've got a glove popped [?] yet.

00 00 31 11 CMP All right, sir; you're on.

00 00 31 13 LMP Okay. I'm sorry, but the evil winds are blowing again, you guys. (Laughter)

00 00 31 16 CDR ...

00 00 31 17 CMP Ain't nothing you can do that's evil right now, babe.

00 00 31 21 LMP You just got to ... - -

00 00 31 22 CDR You know something, I never did like this, and I like it even less in zero gravity. I don't know why anybody ain't squawking.

00 00 31 34 CMP Okay, ... this baby. G/N POWER OPTICS going on. And ZERO OFF. Then ZERO. Oh, that light. ...

00 00 31 52 LMP What's that?

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Day 1

00 00 31 54 CMP Oh, I got a - a caution and warning on the PGNS. I don't know what that was. Must have been taking it out of the - MODE is MANUAL. OPTICS COUPLING is DIRECT. SPEED, HI. Now if ... up there. The ZERO's OFF. Go max speed to the right. The first one that comes off is the sextant at 40 degrees.

00 00 32 32 CDR I don't believe those ...

00 00 32 35 CMP Ha-ha.

00 00 32 42 CDR Ha-ha-ha-ha.

00 00 32 45 LMP What's that, John?

00 00 32 48 CDR Looky here. Well, why don't you get your - Well -

00 00 32 50 CMP Well, darn it. I didn't hear anything come off of the telescope.

00 00 32 54 LMP Did you see out of it?

00 00 32 55 CMP No.

00 00 32 57 LMP Well, keep going.

00 00 32 59 CMP I was going all the way to the Sun. Shoot. Oh, well -

00 00 33 07 LMP Maybe you can run it back again.

00 00 33 08 CMP Yeah.

00 00 33 09 CDR Maybe you ought to go the other way.

00 00 33 11 CMP Well, I don't know. If I could - -

00 00 33 14 CDR Are you seeing anything out of the telescope?

00 00 33 17 CMP No, sir.

00 00 33 18 CDR Well, but that's going to take awhile. You want to turn down the lights, Ken?

00 00 33 20 CMP Yeah. I got my lights down here. I'm going to go ahead and do a P52.

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00 00 33 23 CDR Okay, but - okay, but - -

00 00 33 26 CMP You think there is anything wrong with turning the other way if they didn't - if the cover didn't come off?

00 00 33 30 CDR Well, I think you ought to wait and ask them.

00 00 33 32 CMP I hate to mess up 52. Let's see - let me - let me get myself good and light adapted.

00 00 33 38 CDR Yeah, that's the problem.

00 00 33 39 LMP You want me to turn the lights down?

00 00 33 40 CDR You want to turn down some of the lights?

00 00 33 41 CMP I got my eye closed and -

00 00 33 43 CDR I forgot, the flood's turned all the way up in here. Stars are out there, Ken, I can see them.

00 00 33 50 CMP Well, I don't see a thing. I heard the sextant go.

00 00 33 55 LMP Can't you go back to ZERO and try it again?

00 00 33 58 CMP I'm going to. I'm going to ZERO and ...

00 00 34 19 CDR We're 90 by 95, you guys.

00 00 34 21 LMP That's neat.

00 00 34 23 CMP Okay, you don't see anything wrong with trying to - to do a - Oh, hey, I think I do see some stars now.

00 00 34 29 LMP There you go.

00 00 34 31 CMP Oh, thank God. (Laughter)

00 00 34 33 CDR It takes awhile.

00 00 34 34 CMP Oh, boy, you do have to be light adapted, I tell you.

00 00 34 36 CDR Yeah, yeah.

00 00 34 37 LMP Where? I don't see them. Oh, yeah. There's some, I think ...

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00 00 34 39 CMP Hey, I can - They're off because I saw our thruster fire.

00 00 34 43 LMP I did, too (laughter). Hey, that's a thunderstorm down there.

00 00 34 47 CMP Was it?

00 00 34 48 LMP Yeah. Must be that.

00 00 34 49 CDR Yeah, those are down ... - -

00 00 34 50 CMP I'm looking in the other direction though.

00 00 34 51 LMP Well, I'm looking on the ground - -

00 00 34 52 CMP Okay.

00 00 34 53 LMP - - and that's - that's a thunderstorm.

00 00 34 54 CMP Okay, I'm going to do a 52 if that's all right.

00 00 34 56 CDR ... have to do a 52. That's a ...

00 00 34 58 CMP Okay. I'm gonna - -

00 00 34 59 CDR I haven't got ORDEAL set up, but I got it laying here.

00 00 35 01 CMP Can I get rid of your thing for a minute?

00 00 35 03 CDR Sure.

00 00 35 04 CMP Okay, there's your flow. The OPTICS ZERO is OFF - -

00 00 35 06 CDR What's the - what's the - what should we be doing?

00 00 35 08 CMP - - SPEED should be LO; OFF.

00 00 35 10 LMP I'm gonna turn the page here, and - -

00 00 35 11 CMP I tell you one thing you can do is - I'm going to stay in the dark here, so I can see.

00 00 35 15 LMP Okay.

00 00 35 16 CMP Would you copy these numbers for me?

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00 00 35 17 LMP Yeah, I'll get them for you. John, we're up to speed, as far as I know.

00 00 35 23 CMP I haven't started unstowing stuff.

00 00 35 25 CDR Okay, at 35 minutes.

00 00 35 27 LMP Oh, we got to do the - we got to do the main reg check, and the secondary accumulator quantity.

00 00 35 36 CMP Man, I tell you what, I - There's another thruster fire.

00 00 35 39 LMP Okay. John, you want to go to SECONDARY GLYCOL?

00 00 35 41 CMP Okay, would you record star 23?

00 00 35 43 LMP Okay.

00 00 35 44 CMP Denebola.

00 00 35 53 LMP Okay.

00 00 35 59 CMP I don't - I flat don't think I can see a star pattern at all.

00 00 36 03 LMP Well, I can out the front here, out the rendezvous window.

00 00 36 06 CMP But I got a star in the sextant.

00 00 36 08 CDR What's the name of it?

00 00 36 10 LMP You didn't see Denebola out the big ... - -

00 00 36 12 CMP Okay, I did not see a star pattern.

00 00 36 14 CDR Shoot.

00 00 36 16 CMP And I'm - I'm well adapted enough in that - but I - I'm sure that the cover's off because -

00 00 36 25 CDR You can see some stars?

00 00 36 26 CMP Because I see flashes, and - and occasionally I can see a star, but it's just - you know, you can't miss Denebola.

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00 00 36 35 CDR Well, let me look whenever we get a chance here.  
... - -

00 00 36 37 CMP All right. You got any question about whether it's  
okay to proceed with them?

00 00 36 40 LMP Heck, no. Go, man.

00 00 36 42 CMP Okay. Yeah.

00 00 36 44 LMP Hey, John?

00 00 36 45 CDR Yes, sir.

00 00 36 46 LMP We want - we can do a secondary glycol accumulator  
or loop check - leak check, if you want to.

00 00 36 51 CDR Yeah. ... Ken ... numbers ... - -

00 00 36 53 CMP Okay, hang on a second and I will. Load it ...  
... procedure.

00 00 37 01 LMP This is so great.

00 00 37 07 CMP Those optics ... are superb.

00 00 37 16 CMP Okay, the second star is number 30.

00 00 37 19 LMP Okay.

00 00 37 20 CMP Wouldn't you know. Just what I always wanted.

00 00 37 22 LMP What's the number?

00 00 37 23 CMP There it is. Menkent. That may not be in the  
sextant.

00 00 37 24 CDR ... what it is.

00 00 37 29 CMP By golly, there are some stars out there. One just  
went by. ... went by. But I'm sure - and I see  
some of those - Gosh, it looks like the center of  
the sextant - or the telescope is where I'm seeing  
... But this thing is - auto optics is just neat  
as I thought it was.

00 00 37 48 LMP Man, I can't believe that. I just can't believe our  
view (laughter).

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00 00 37 52 CDR Golly, you're here.

00 00 37 54 LMP I mean (laughter).

00 00 37 55 CDR Twelve days from now, you won't believe it.

00 00 37 58 LMP This is fan - You know, I just can't believe how much a thrill this is.

00 00 38 01 CDR It's really swinging, isn't it?

00 00 38 02 LMP Oh, man, I've waited - -

00 00 38 03 CMP I mean to tell you.

00 00 38 05 LMP - - so long for this.

00 00 38 06 CDR Just - just look! Look at that! Just hold your cottonpicking hand out there in a 70-pound pressure suit, and you ain't got nothing on.

00 00 38 17 CMP Oh, there's - -

00 00 38 18 CDR That was a good start.

00 00 38 19 CMP That's a good start.

00 00 38 20 CDR There you go there, Ken, babe. Look at those torquing angles! (Laughter).

00 00 38 23 CMP (Laughter)

00 00 38 24 CDR Whoo, hoo, hoo!

00 00 38 25 CMP You got those copied?

00 00 38 27 LMP Wait, 040 - -

00 00 38 28 CDR Yeah.

00 00 38 29 LMP - - plus - -

00 00 38 30 CDR 031.

00 00 38 31 LMP Plus 031.

00 00 38 32 CDR Plus 045.

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00 00 38 34 LMP Plus 045. I got them. Give me the DET and I'm ready.

00 00 38 38 CMP Okay. I'll torque them at 40.

00 00 38 39 LMP Okay.

00 00 38 40 CDR Might as well ... - -

00 00 38 41 CMP Go. Okay, 38:40. Just for kicks, I'm going to do that over again.

00 00 38 45 LMP Okay - -

00 00 38 46 CDR No, you don't, Ken - -

00 00 38 47 LMP No. Come on.

00 00 38 48 CDR - - you don't need to do it again, honest.

00 00 38 49 CMP Okay.

00 00 38 50 CDR You're gonna get a blue million of them.

00 00 38 51 CMP Okay, that that really feels good.

00 00 38 52 LMP Yeah. ... of those ... EMP.

00 00 38 55 CDR Because we're liable to have our torquing angles doubled the next time we did it.

00 00 38 58 CMP That's right. I don't want to know it if it is - -

00 00 39 00 LMP Okay, John, get - -

00 00 39 01 CMP - - ... torture.

00 00 39 02 LMP Give him a - -

00 00 39 03 CDR ... tool E?

00 00 39 04 LMP Give him a tool E.

00 00 39 05 CDR Okay.

00 00 39 06 CMP Yeah. I was going to float myself along underneath there, if you - -

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00 00 39 07 CDR I got the ORDEAL up.

00 00 39 08 CMP You have? Oh, you - -

00 00 39 10 CDR (Laughter)

00 00 39 11 CMP That's ... I - in my job. It's so easy to do.  
Too late. (Laughter) Oh, ...

00 00 39 20 LMP You know, I do feel like I'm standing on my head.

00 00 39 22 CMP I don't. I feel like I've been here all my life.

00 00 39 25 CDR Yeah, that what comes with 2000 hours under your  
belt.

00 00 39 28 LMP Yeah.

00 00 39 30 CDR Okay, now I need a flashlight to see what the angle  
is. Okay, when do you want to do this, Charlie?

00 00 39 36 LMP Okay, let me see. SECONDARY ACCUMULATOR QUANTITY  
is at 40. Go ahead, any time for 30 seconds. I'll  
give you a mark. Give me a mark when you open it.

00 00 39 43 CDR Okay, going - going to NORMAL? Right?

00 00 39 47 LMP Yeah. Go to NORMAL.

00 00 39 48 CDR Okay; 3, 2, 1 -

00 00 39 50 CDR NORMAL.

00 00 39 51 LMP Okay.

00 00 39 52 CDR It's NORMAL.

00 00 39 56 CMP You guys are screwing with my union card.

00 00 39 58 CDR Let me get out of your way there, ...

00 00 40 01 CMP Okay. I'm gonna go play with the regulators. Okay?

00 00 40 04 CDR Let's have a sandwich.

00 00 40 05 CMP Hey, let's get this all cleaned up ... - -

00 00 40 06 LMP Yeah, let's get it cleaned up.

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Day 1

00 00 40 08 CDR It's clean as a whistle.

00 00 40 09 CMP Oh, I want to get these regulators checked and all that stuff that I haven't done. Okay.

00 00 40 13 CDR Say when you want to shut it off, Charlie.

00 00 40 14 LMP They're fine (laughter). Okay -

00 00 40 21 LMP MARK.

00 00 40 22 CDR Okay, going to BYPASS.

00 00 40 23 LMP Okay, it's good.

00 00 40 24 CDR BYPASS.

00 00 40 25 LMP Loop's good. Okay, we should ... ECS, and then the FILL valve ... ON.

00 00 40 29 CMP Okay. I'm turning MAIN REG B to off.

00 00 40 35 LMP Okay.

00 00 40 40 CMP EMERGENCY CABIN selector is going to 1. All right. How's the flow look ...?

00 00 40 46 LMP It's 0.2.

00 00 40 47 CMP Okay. I'm gonna hit the PRESS TO TEST.

00 00 40 48 LMP Okay.

00 00 40 52 CMP Did you get some flow there?

00 00 40 54 LMP A little bit, yeah.

00 00 40 55 CMP Okay, I may have ... in ... a little long - -

00 00 40 57 LMP I think you did. I - Okay, that's it. ... out.

00 00 41 02 CMP Okay. Go back to normal?

00 00 41 04 LMP Not yet. Here it comes.

00 00 41 08 CMP All right, REGULATOR B is coming on.

00 00 41 10 LMP Okay.

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00 00 41 11 CMP And A is coming off.

00 00 41 14 LMP Okay.

00 00 41 15 CMP Going to number 2. ... valve A close, number 2.  
Away we go.

00 00 41 26 LMP Okay, it came up a little bit, Ken.

00 00 41 27 CMP You want me to hold it longer?

00 00 41 28 LMP That - No, that's fine with me.

00 00 41 29 CMP Okay. Go back to normal?

00 00 41 30 LMP Yeah.

00 00 41 32 CMP Well, I'm working mine. There's BOTH.

00 00 41 35 LMP Okay, I'm going to do - We've been up here long  
enough. I'm gonna do the fuel cell purge.

00 00 41 39 CDR There's - REG A.

00 00 41 40 LMP And check them out.

00 00 41 42 CMP Hey, John, do you - did you do that secondary leak?

00 00 41 44 CDR What's that?

00 00 41 45 LMP Fuel cell - Don't panic. I'm just testing them a  
little bit.

00 00 41 47 CDR Yeah, but still - you know.

00 00 41 48 LMP Yeah.

00 00 41 49 CDR I don't ... - -

00 00 41 50 LMP What the heck? I said I was going to do the fuel  
cell - -

00 00 41 52 CDR Yeah, I know. I knew it. I'm sorry. I don't want  
anything to spoil this guy now.

00 00 42 01 CMP ... Did you do the secondary leak check?

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00 00 42 02 LMP Yeah. It passed.

00 00 42 03 CMP Yeah, so I can get number 6.

00 00 42 06 CDR Well, we just floated down there, Ken. It's so easy. (Laughter) Oh, gosh. This has really ruined me for this. (Laughter)

00 00 42 17 LMP Okay, PURGE LINE HEATER is OFF.

00 00 42 20 CDR What do I do with this tool E? Just let it sit there.

00 00 42 23 LMP Okay, I'm going to check the cryos.

00 00 42 27 CMP Okay, John. I'm going to pass you up some stuff from down in A-8, if that's okay.

00 00 42 31 LMP Oh, wait - could you wait just - -

00 00 42 33 CDR Sure, man - -

00 00 42 34 CMP Sure.

00 00 42 35 CDR - - what is it?

00 00 42 36 LMP Go ahead.

00 00 42 37 CDR Throw it to me.

00 00 42 38 CMP I'll wait.

00 00 42 39 LMP Okay, I'll - I know some of that stuff has got to be coming over to me, and I'm - -

00 00 42 40 CDR You ain't ready for it?

00 00 42 41 LMP I ain't r - quite ready for it yet.

00 00 42 42 CDR I - I - I've got the bracket down there for the camera. Ha, ha, ha.

00 00 42 47 LMP Okay, check your surge tank pres - Okay, I got that. Cryo fans, off; on as required. Okay.

00 00 42 53 CMP Oh, here's the nicest part of all in zero-g - -

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00 00 42 54 LMP Fuel cell heaters. Okay, that's ... - -

00 00 42 57 CMP The container comes out of B-1 (laughter).

00 00 42 59 LMP Okay, that ...

00 00 43 00 CMP Yeah, (laughter) that would be the part (laughter).

00 00 43 02 CDR ... can, too, and go back in just like downtown.

00 00 43 08 CMP John?

00 00 43 09 CDR Yes, sir.

00 00 43 10 CMP May I present you with a 70-millimeter Hasselblad.

00 00 43 15 SC (Laughter)

00 00 43 22 CDR Oh, this is as nice as it's always been. That's all I've got to say. Just can't beat all this floating around.

00 00 43 27 CMP But, in Gemini, you couldn't move around to enjoy it. This has got to be better than that kind of ... Phew! Can you imagine what those guys are going to do when they get in Skylab?

00 00 43 44 LMP Well, I ain't gonna trade with them, I'll tell you that right now.

00 00 43 47 CMP No, but they are gonna have a ball. When they get that great big volume down there.

00 00 43 53 CDR How are we going to drink water? That's been worrying me ever since we took off. You got to keep a count of it some way or another?

00 00 44 01 CMP Well, I don't know. I'll check and see if ...

00 00 44 04 CDR Well, we're supposed to.

00 00 44 06 CMP If so, it's not going to be any big deal, I can guarantee you.

00 00 44 10 LMP Hey, how's the systems test look, 5B?

00 00 44 13 CMP Looks good; okay.

00 00 44 15 CDR I'm going to hang tool E around the handle up here. Is that a good place?

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00 00 44 17 CMP Okay, just be sure - -

00 00 44 19 CDR Do you have a place it ...?

00 00 44 20 CMP No, that'd be fine. Just be sure it's snapped wherever you put it. You know, it won't - I already made that hanging mistake once (laughter).

00 00 44 27 CDR Yeah, well, the thing is, it's - the thing around it is really tight, this snap around it.

00 00 44 38 CDR There must be something I have to do but I don't know what it is.

00 00 44 41 CMP (Laughter) I think it's the ...

00 00 44 44 CDR Golly, I mean to tell you. If this isn't gonna be the neatest thing that ever was.

00 00 44 52 LMP (Laughter) Oh, my helmet.

00 00 44 53 CDR Can't wait to get into that lellum [?].

00 00 44 55 LMP Yeah.

00 00 44 58 CDR The thing just ... for another 5 minutes and 44 seconds. The pressure's all right - 48 - 38 and 18, just exactly what they were at that other thing.

00 00 45 17 CMP For you, my friend, if you'll pull out a - out of that little U compartment down there, the camera bracket.

00 00 45 24 CDR I already did.

00 00 45 26 CMP Oh, you - Oh.

00 00 45 28 CDR Ha, ha, ha, ha. Well, I've got all these cameras, and I don't know what to do with them. It's really neat.

00 00 45 34 CMP Here, I tell you what we'll do with one is raise your foot, right here, to start with. I guess we - I tell you what. You don't really need that guy right now. I can stow it back here in the - -

00 00 45 44 CDR What, the Hasselblad?

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00 00 45 45 CMP - - in - No, the DAC.

00 00 45 47 LMP Okay, John. You're supposed to do a - a GDC align.

00 00 45 51 CDR Okay.

00 00 45 52 CMP Here, let me stow that DAC.

00 00 45 53 CDR No, let me just stick it on the thing. It's as good a place for it as any.

00 00 45 56 CMP It won't be in your way ...?

00 00 45 57 CDR No.

00 00 45 58 CMP Okay. Why don't we - you want to set it while we're about it, then?

00 00 46 04 CDR Yeah. The T - the -

00 00 46 06 CMP I hadn't - I didn't set it at all yet.

00 00 46 09 CDR T - T-8 - -

00 00 46 10 LMP Is that - is that APS mod - is that the APS module that's causing all those ... flashes?

00 00 46 14 CMP ... want a T-8, John?

00 00 46 17 CDR T-8 at 10 feet, right?

00 00 46 18 CMP Ten feet, 1/250 - -

00 00 46 19 CDR 1/250, at 12 frames a second.

00 00 46 21 LMP I just started the secondary coolant loop pump.

00 00 46 22 CMP Okay.

00 00 46 24 CDR Good, Charlie.

00 00 46 25 CMP That's magazine AA.

00 00 46 28 CDR Magazine - AA is what's on there. How about that? Another new ... - -

00 00 46 33 CMP You're kidding me.

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00 00 46 35 LMP It's really there?

00 00 46 36 CDR Yep.

00 00 46 37 CMP (Laughter) Okay.

00 00 46 42 LMP Can't believe it.

00 00 46 44 CMP (Laughter) Okay, you got the EL, John?

00 00 46 45 CDR The what?

00 00 46 47 CMP You got the Hasselblad?

00 00 46 48 CDR Yeah.

00 00 46 49 CMP How about an f/8?

00 00 46 52 CDR Okay, f/8.

00 00 46 53 CMP 1/250.

00 00 46 55 CDR Reads 250th.

00 00 46 57 CMP And - -

00 00 46 58 CDR And infinity?

00 00 46 59 CMP Well, why don't you take it about 10 feet and go - well, put it on infinity for the time being. We might - -

00 00 47 03 CDR Okay, because as we come across the ..., we might see something. Yeah.

00 00 47 06 CMP Okay, and that thing just gets stowed out here. Here, I - I put up my little - -

00 00 47 12 CDR I can't do it; they put Velcro right here.

00 00 47 13 CMP - - ... my goody bag.

00 00 47 14 CDR You don't want to do that.

00 00 47 15 CMP Oh, okay.

00 00 47 17 CDR It can't get loose unless somebody bumps it.

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00 00 47 19 CMP Well, where did you put it?

00 00 47 20 CDR Right there. See?

00 00 47 22 CMP Okay.

00 00 47 23 CDR Isn't that neat?

00 00 47 24 CMP Okay. I've got to - -

00 00 47 25 CDR I could have nailed it right up here to this Velcro, but I don't think ... - -

00 00 47 27 CMP Well, here. I've been using this little goody bag and getting my stuff emptied out of it.

00 00 47 31 LMP Okay, here come the TSBs, you guys.

00 00 47 35 CDR Old TSB Charlie.

00 00 47 36 LMP It is so white and pretty.

00 00 47 39 CDR Kind of like our suits.

00 00 47 40 LMP Who wants one? Ken, there's one for you.

00 00 47 43 CMP Okay, I'll be with it in a second, as soon as I get my things put in here.

00 00 47 51 CDR (Singing) I'll be dancing ... - -

00 00 47 53 LMP ... be right in front of us on these, are there? They're all the same.

00 00 47 54 CDR - - before I leave.

00 00 47 56 CMP I don't think there's any difference. I think it's like - like ... Okay. Oh, ... I was gonna put this thing back once you get the CMC up.

00 00 48 17 LMP Okay, John, here's one for you.

00 00 48 19 CDR Oh, that's sure nice, Charlie. I'm sure glad you gave me that TSB.

00 00 48 22 LMP I thought you'd like that.

00 00 48 24 CMP Okay, how about the - -

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00 00 48 25 LMP Aren't - aren't I supposed to put some cameras and mags back in here? In U-1?

00 00 48 30 CMP Yeah, I think that's ... yet, Charlie.

00 00 48 31 LMP Okay. I'll leave it ... - -

00 00 48 32 CMP I'm taking one last look at my sextant - my telescope here - -

00 00 48 34 LMP Leave it at ... - -

00 00 48 36 CMP - - before I screw up on it.

00 00 48 37 CDR Oh, ho.

00 00 48 39 CMP I got a star in it now.

00 00 48 40 CDR Hee, hee. Hee, hee, hee. It got away from me. Come back here, you ... (laughter).

00 00 48 49 CMP Gosh, this is mag - Oh, look at those pretty stars. Look at that. Oh.

00 00 49 08 LMP Okay, GDC align is all we got left.

00 00 49 12 CDR Okay, Charlie. I'll align the old GDC. That'll be roll 180 -

00 00 49 17 CMP I know, I couldn't be looking at Denebola again, but -

00 00 49 21 CDR Can you see a pattern?

00 00 49 23 CMP Yeah, I don't recognize it. It's brighter than heck. It looked like Denebola, but - -

00 00 49 26 CDR ... constellation is ...

00 00 49 27 CMP I bet it is.

00 00 49 34 LMP See, the horizon is beginning to light up.

00 00 49 46 CMP Oh, and I just won me a beer.

00 00 49 49 CDR What's that?

00 00 49 50 CMP Well, maybe I didn't here. What's going on?

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00 00 50 01 LMP I'm turning up S-band volume for the - -

00 00 50 03 CMP Oh-oh - -

00 00 50 04 LMP - - Canaries check.

00 00 50 05 CMP - - I wonder.

00 00 50 06 CDR Okay, Charlie. We got a little roll drift in the GDC and a little yaw drift, but we don't have a heck of a lot of other, and it's - Goldang, it's been running for 50 minutes, and it's off 5 degrees in yaw - 5 degrees in yaw - and we're on RATE 2, so you don't really know. And 2 degrees in pitch - Heck, I'll take that. And - and 8 degrees in roll for 50 minutes. That's with the BMAGs ... That ain't really all that bad.

00 00 50 44 CMP Oh, I can even see stars now with the reticle turned on. Is it - guess what I got? Antares!

00 00 50 55 CDR Beautiful.

00 00 50 57 CMP (Laughter) It even looked like Scorpio (laughter).  
Oh.

00 00 51 05 CDR Okay, the GDC's aligned behind - to behind you at 51:05.

00 00 51 09 LMP Mark that down.

00 00 51 10 CDR So I get a - Then I have that we're on RATE 2, BMAGs.

00 00 51 15 LMP 51:05.

00 00 51 16 CDR Yeah, I'm gonna do some scientific research on this thing with my little pen - unless some dingaling give me a ... pen. ...

00 00 51 31 LMP Okay, I - Do you want to do this reference comparison - SCS attitude reference comparison check, John?

00 00 51 37 CDR Yeah, but I - can we do it until after we've had some - -

00 00 51 40 CMP You've got to compile them.

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00 00 51 42 LMP Oh, okay. That's right. ... be sure.

00 00 51 47 CMP Oh, you beautiful ... You little beauty. Hoo, hoo.

00 00 51 57 LMP Okay, there's the comm coming up.

00 00 52 00 CMP Well, I won me a six-pack.

00 00 52 03 CDR What's that?

00 00 52 04 CMP I said that if I went from MANUAL, that the optics would drift.

00 00 52 09 CC ... Houston through Ca - Carnarvon. Over.

00 00 52 13 CDR Hello there, Houston. Read you loud and clear.

00 00 52 15 CMP Tell them where we are.

00 00 52 16 CC ... loud and clear also.

00 00 52 17 LMP Okay. Okay, Gordy. We're down through - on page 2-17, Ken's done the P52, and -

## TIME SKIP

00 00 57 30 CDR Can you handle this, Charlie?

00 00 57 32 LMP Yeah. Yeah, I can handle one of them.

00 00 57 34 CDR Want me to unstow your panel here?

00 00 57 39 LMP No, no. Huh-uh. I don't ... - -

00 00 57 40 CDR ... do that.

00 00 57 48 CMP ... as crummy in zero g as they are on the ground. ...

00 00 58 00 CMP John?

00 00 58 01 CDR Yeah.

00 00 58 02 CMP Got a ... that's coming up by your sh - ... that's your shoulder. Your ... right? No, ... going the wrong way. That'll get it. Okay, and here's the UV magazine. It goes over by Charlie.

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00 00 58 22 CDR Okay. What was that? I just keep handing them to Charlie. I don't know what he's ... - -

00 00 58 29 LMP Well, wait a minute, now. I'm getting my hands full here.

00 00 58 31 CMP Okay. Well, the UV thing is the one that goes in - goes in that ... - -

00 00 58 35 LMP Yeah. Okay, John. You hold the camera and pass me the UV thing.

00 00 58 47 CMP John, you got your hands full?

00 00 58 48 CDR Yeah. I'll take it.

00 00 58 49 CMP Okay, I'll wait.

00 00 58 50 CDR What do you need?

00 00 58 51 CMP I got two TV cables here.

00 00 58 52 CDR Oh, heck. I can take them.

00 00 58 54 CMP All right. The rest of this stuff I'm going to just go ahead and put up in the - in - my little stowage place up here, I think - while I'm here. Don't see any reason why not. Why not? Oh, you're gonna earn your pay today. I know you do good work ...

00 00 59 38 CMP (Singing) De-de-dum-dum. Do-bee-do-dah-do-bee-do-bee-do. (Whistling) You're right. That camera did very well without practice.

00 00 59 58 LMP (Laughter)

00 01 00 26 CDR ... could have gone all day without telling about that.

00 01 00 28 LMP Yeah.

00 01 00 29 CDR That ain't no problem, but ... those dingalings.

00 01 00 33 CMP Oh? Why do you say that, John?

00 01 00 35 CDR Well, I mean, I don't want to know there's a APS overpressure rate. What the heck can I do about it?

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00 01 00 40 CMP Yeah, I guess - -

00 01 00 41 CDR But I - I don't have no gages to be alert for it, or what? Well, if they want me to take some positive action, like putting on my helmet and gloves, why - they ought to say so, don't you reckon?

00 01 00 52 CMP Yeah, but I think we - at least, I have badgered them so much about - you know - just ... looking at something, that maybe -

## TIME SKIP

00 01 03 33 LMP Well, Ken, you might have your work cut out for you.

00 01 03 36 CMP It sure sounds that way.

00 01 03 40 CDR Well, shoot. Now I've got to set up ORDEAL. Can I call VERB 83?

00 01 03 46 CMP Yes, sir. Go ahead.

00 01 03 48 LMP Look at that sunrise coming up, you guys.

00 01 03 51 CDR Oh, yeah?

00 01 03 52 LMP (Laughter)

00 01 03 53 CC ... LOS ...

00 01 04 06 CDR Roger.

00 01 04 07 CMP Sunrise out there?

00 01 04 08 LMP Yeah, it's coming up. See it. On the horizon.

00 01 04 12 CMP Oh! Oh, look at that! Isn't that - Holy smokes. Have you ever seen anything like that?

00 01 04 25 CDR ... beautiful?

00 01 04 27 CMP Oh.

00 01 04 28 LMP That is really bright.

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00 01 04 30 CMP Man, that is - Gosh!

00 01 04 34 LMP Hey, what does that mean to us now, is this - on this APS module.

00 01 04 37 CMP Data ... Get ahold of the - (laughter) It doesn't need APS for - it needs its attitude control.

00 01 04 45 CMP Yeah. It doesn't have anything to do with TLI. How do we get our LM? You got your UV shade in the window, have you, Charlie?

00 01 04 53 LMP Yes.

00 01 04 54 CMP Did you have any trouble getting it in?

00 01 04 55 LMP Nope.

00 01 04 56 CMP You said something about getting it in.

00 01 04 57 LMP I had it in backwards.

00 01 04 58 CMP Okay. Because that UV is - is a-coming at us. Okay, I'm gonna start unstowing some Flight Data File stuff - pad updates.

00 01 05 11 LMP Man, I think we've had sunrise.

00 01 05 15 CMP You're right. Look how pretty it is. Now, how do we ... - -

00 01 05 22 LMP Hey, Ken, where can we put this - the cover for the TV lens? It doesn't have a piece of Velcro.

00 01 05 26 CMP Oh, okay. I'll - I'll put it down here with my optics cover - where I keep my optics in this little ... pouch.

00 01 05 36 LMP Okay.

00 01 05 37 CMP Right down here.

00 01 05 38 LMP Right.

00 01 05 51 CMP All the time we saved with that, I though we would ...

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00 01 06 17 CDR Well, I got an idea. We could get - we could do VERB 46, pitch it out of attitude, so it'd have to fire that APS module, and get back in.

00 01 06 25 CMP Well -

00 01 06 26 LMP Then it wouldn't ...

00 01 06 27 CMP Trouble is, there's too much backing up ... determine ...

00 01 06 32 CDR Well, the pressurization looks good. We got to get it down. What - what he's saying really is, we got to empty some of that fuel out of there. Right?

00 01 06 40 CMP Yeah. What do you think?

00 01 06 47 LMP Well, like he says - it seems to me what he means is that - is that the thing's just going to deplete the helium in there.

00 01 07 00 CMP That's ... It do seem like helium did that.

00 01 07 11 CDR Okay, get to those procedures on that page, and tell me what they are.

00 01 07 19 CMP Okay, that - that would be where? In what?

00 01 07 43 CDR Flight Data File plus Dr. Spock's baby book.

00 01 07 49 CMP (Laughter) You're kidding.

00 01 07 50 LMP (Laughter) Oh.

00 01 07 58 CMP Would I be allowed to take a picture out here?  
(Laughter)

00 01 08 02 CDR ...

00 01 08 05 CMP You want the spotmeter?

00 01 08 07 CDR No, I'll just use it 250, f - f/8 and ... - -

00 01 08 09 CMP Okay.

00 01 08 10 CDR - - at the ...

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00 01 08 18 CMP Flight Plan, volume 1, ... Data Book. Data we essentially won't need for a while.

00 01 08 33 CDR Oh, ... That's nice.

00 01 08 38 LMP What, John?

00 01 08 40 CDR I got the dark slide in.

00 01 08 41 MS (Laughter)

00 01 08 42 CDR Dang it.

00 01 08 44 CMP (Laughter) Oh, you're off to a good start, leader.

00 01 08 50 CMP Lunar orbit chart.

00 01 08 53 CDR I got an Earth orbit chart here, but I don't think anybody really cares. Do you?

00 01 08 56 LMP No.

00 01 08 59 CMP There's one over there that's supposed to be ...

00 01 09 11 CMP Okay, Charlie. I'm going to give you R-12.

00 01 09 15 LMP Yeah, wait a minute. I got to get this - -

00 01 09 16 CMP Okay. You want me to get that? The last three times, I've been able to just walk up there and put it in.

00 01 09 22 LMP Yeah, naturally, the flight one doesn't have a color code on it. ...

00 01 09 31 CMP Hey, that's a - we're not - are we up on the States yet?

00 01 09 34 LMP No, huh-uh.

00 01 09 37 CDR No. We're at 01:09. Where does that put us, Charlie?

00 01 09 41 LMP Hey, your docking probe thing is out over here, your docking light.

00 01 09 45 CMP Yeah.

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00 01 09 46 LMP Okay.

00 01 09 47 CMP Hey, come on ... - -

00 01 09 48 CDR Yeah. It stays out.

00 01 09 50 LMP Okay.

00 01 09 51 CMP We couldn't be in the States, could we?

00 01 09 52 LMP Come on ...

00 01 09 53 CDR We're at an hour and 9 minutes.

00 01 09 54 CMP Where's that? That's darn close.

00 01 09 56 CDR No, it ain't.

00 01 09 57 CMP Isn't it? Well - didn't I see some land go underneath us?

00 01 09 59 CDR No, you didn't.

00 01 10 02 CMP (Laughter) Okay, Charlie. ... go in there.

00 01 10 06 LMP Okay, I'll get that out of my pocket in a little bit.

00 01 10 09 CMP Okay.

00 01 10 10 CDR Where are we at, though, Charlie? Does it say?

00 01 10 13 CMP He talked to us from Carnarvon a few minutes ago.

00 01 10 15 LMP Yeah - -

00 01 10 17 CDR We're about halfway across the Pacific.

00 01 10 20 CMP I thought I saw - maybe that was Hawaii. Huh? I thought I saw some land down there.

00 01 10 24 LMP What the heck? My checklist floated to the wrong page. U.S. AOS, 01:28.

00 01 10 33 CDR Yeah, we're a long way from ... Is there any ship or anything that we'd be talking to between now and then?

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00 01 10 39 LMP Nope. You want to do this SCS attitude reference comparison check test?

00 01 10 45 CDR Yeah.

00 01 10 46 LMP Okay. VERB 16 NOUN 20.

00 01 10 49 CDR Okay.

00 01 10 51 LMP FDAI SELECT, 1.

00 01 10 56 CDR FDAI SELECT to 1.

00 01 10 59 LMP Um-hmm. FDAI SOURCE, ATT SET.

00 01 11 01 CDR ATT SET. Go.

00 01 11 04 LMP ATT SET to GDC.

00 01 11 05 CDR ATT SET to GDC.

00 01 11 06 LMP ATT SET dials, null FDAI 1 error needle.

00 01 11 09 CDR Okay.

00 01 11 23 CDR Okay. Okay, and - -

00 01 11 28 LMP Okay, key V - Null the needles. Key VERB when nulled. Freeze display. And then - -

00 01 11 36 CDR Okay, key - key VERB when nulled. Freeze display. Okay -

00 01 11 46 CDR MARK it.

00 01 11 47 LMP Okay, give me from the DSKY roll, pitch, and yaw.

00 01 11 53 CDR Well, I key released it. Let me ... - -

00 01 11 55 CMP A LM chart? Oh, it's a LMP book.

00 01 11 58 LMP Yeah, there's a lot of LM stuff in there.

00 01 11 59 CDR (Laughter)

00 01 12 02 CMP Man, I don't understand why I got an AOT tag. It's not the ... - -

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00 01 12 13 CDR Okay, VERB. Go.

00 01 12 14 LMP Okay.

00 01 12 15 CDR 179.79.

00 01 12 19 LMP Okay.

00 01 12 20 CDR Plus 086.86. That's on the DSKY. Plus 000.78.

00 01 12 28 LMP 000.78. Okay.

00 01 12 29 CDR Yeah.

00 01 12 30 LMP What are the thumbwheels?

00 01 12 31 CDR Thumbwheels say 178.4.

00 01 12 36 LMP Okay.

00 01 12 37 CDR Pitch is 088.2.

00 01 12 41 LMP Okay.

00 01 12 42 CDR Yaw is 356.2.

00 01 12 44 LMP What's your time?

00 01 12 47 CDR Time is - 1 hour 12 minutes and 45 seconds.

00 01 12 52 LMP Okay, that's nine at 21-minute check, and we got 1 degree on roll, got 2 degrees on - 1-1/2 degrees pitch, and about 4 degrees yaw. FDAI SELECT, 1/2, John.

00 01 13 14 CDR Okay. Well, tell me what that thing on page 2- whatchacall it says, Charlie.

00 01 13 24 LMP Dash 10.

00 01 13 33 LMP Okay. Spacecr - service module RCS control of S-IVB. LAUNCH VEHC - If APS module failed, LAUNCH VEHICLE GUIDANCE, CMC; MANUAL ATTITUDE ROLL, MINIMUM IMPULSE.

00 01 13 45 CDR Okay.

00 01 13 46 LMP CB SECS ARM, two, close. AUTO RCS SELECT, PITCH

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00 01 13 53 CDR CB SECS ARM, two, closed?

00 01 13 55 LMP Yeah.

00 01 13 56 CDR Yeah? Okay ... get the ... on this here.

00 01 14 01 LMP Okay, then we got turn off - turn on - put A/C ROLL to MAIN B, and B/D ROLL to MAIN A. Then RCS COMMAND to on.

00 01 14 10 CDR A/C ROLL to MAIN B, B/D ROLL to MAIN A.

00 01 14 21 CMP Want to give me your boost cards?

00 01 14 22 CDR Why do we do that? ...

00 01 14 23 CMP I'm sorry.

00 01 14 24 LMP To get - to get commands - to get roll commands. Here - here's one, Ken.

00 01 14 30 CMP Okay, are you through with that?

00 01 14 32 LMP Yeah, I'll just leave the landing card up here. Okay?

00 01 14 34 CMP All righty.

00 01 14 35 CDR Oh, shoot.

00 01 14 36 LMP Okay, you want to take it down? I don't care.

00 01 14 38 CMP (Laughter) I'd like a more positive approach, Charlie. John, you want to give me some of your - -

00 01 14 44 LMP Wait a minute. Let me have the - L - the boost cards back. It's got the TLI no-go's on it.

00 01 14 50 CMP Okay. Well, that's - this one?

00 01 14 54 LMP Yeah.

00 01 14 55 CMP There you go.

00 01 14 56 LMP Okay. Okay, then after that, the booster - guy he confir - he commands the burn mode.

00 01 15 06 CMP These two over there?

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00 01 15 21 LMP Says if that's successful and we get control, the LAUNCH VEHICLE GUIDANCE back to IU; we control pitch and yaw with THC, roll with RHC. Allow S-IVB to drift in pitch, gravity gradient. Control yaw within platform limits. Perform normal procedures except time base 6 minus 15 minutes, maneuver to TLI attitude and set up ORDEAL. Hold TLI attitude until ignition. Null ullage deviations with service module RCS. After ignition, RCS COMMAND, OFF. AUTO RCS SELECT, 16, MAIN A, MAIN B. MANUAL ATTITUDE, three, to RATE COMMAND. After cut-off, go back to CMC. MANUAL ATTITUDE, three, ACCEL COMMAND. RCS COMMAND, ON.

00 01 16 15 CDR Okay. Well, that's a good thing. I'm sure glad you told me that, Charlie. That - there's the Moon.

00 01 16 20 LMP Where?

00 01 16 21 CDR Out the front window.

00 01 16 23 CMP Hey, John. Would you put my DAC ... for me, please?

00 01 16 26 CDR Yeah, ...

00 01 16 27 CMP Okay.

00 01 16 33 CDR It's awful stiff Velcro.

00 01 16 34 CMP It goes right over the DSKY. Doesn't it fit there?

00 01 16 36 CDR Oh! Oh! Oh! Oh! It goes right over the DSKY (laughter).

00 01 16 41 CMP It - I mean, it probably really does.

00 01 16 45 CDR ... - -

00 01 16 46 CMP ... on top of that little DSKY. It doesn't fit there?

00 01 16 48 CDR Yeah, it does. And that's ... coming up.

00 01 16 57 LMP I can't get my head down far enough. Oh, yeah, look at that. That - Ken, you ought to ... up here and look at that - -

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00 01 17 01 CMP I don't have the time. I'm getting my - last little chore done here. I got - I think I overdid it.

00 01 17 09 CDR (Laughter)

00 01 17 14 CMP (Laughter) Things are getting out of hand.

00 01 17 18 CDR Well, let's take it f/11, at 250 - -

00 01 17 20 LMP Are getting kind of what?

00 01 17 21 CDR You think in the middle of the day, we should go to f/11, Ken, or f/8 is still good enough?

00 01 17 26 CMP Well, I'm just thinking. I've got a little bit of ... in that.

00 01 17 29 CDR Well, I think f/11 for this time of day is probably the best you can do.

00 01 17 34 CMP Okay, we got all the cards we're gonna need now? For TD&E and all that stuff, straight through.

00 01 17 38 LMP Gosh.

00 01 17 39 CMP I got the Flight Plan out; I got the G&C Checklist; I got the Surface Checklist available; I got the star charts, I got the TLI cards, got the TD&E card in my pocket. Anything else we'd be likely to need?

00 01 17 54 LMP Nope.

00 01 17 57 CMP Here's your antenna card. Why don't you just stick that up? (Laughter)

00 01 18 00 LMP Okay, thank you ... my copy.

00 01 18 02 CMP ...

00 01 18 05 LMP Thank you.

00 01 18 08 CMP I think I'm gonna sit down and think some more about that TD&E.

00 01 18 14 CDR Okay, there ain't nothing we can do about it if that module ain't holding attitude.

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00 01 18 19 CMP If it won't hold in attitude, we'll go get it out of attitude.

00 01 18 21 CDR That's right.

00 01 18 22 LMP Looks like it's in attitude now.

00 01 18 24 CMP Well, it is. I just don't want that little bugger to blow up back there, and get a leak - -

00 01 18 29 CDR That's exactly what I've been thinking all this time. You know, they ain't never said nothing about that.

00 01 18 34 LMP Well, they got this - -

00 01 18 35 CMP They said they got that relief valve.

00 01 18 36 LMP They got the relief valve.

00 01 18 38 CDR Yeah. God willing, when the relief valve comes through, Charlie.

00 01 18 44 CMP But he said it was over the relief pressure, didn't - already, didn't he?

00 01 18 47 CDR Something like that - -

00 01 18 48 LMP He said that it was - as far as they could tell, it was right at the relief pressure. How can - -

00 01 18 52 CMP ... you talking about? We don't have double gage [?]. We didn't start -

00 01 19 02 LMP I'm gonna take this thing - little dealy off here. The official ASPO circuit breaker putter-inner. Coming off.

00 01 19 16 CMP Okay, I've got a stowage place for it, but it's kind of hard to get to right now.

00 01 19 19 CDR Oh, yeah.

00 01 19 20 LMP You just want me to leave it on, then?

00 01 19 21 CMP If it's not in your way.

00 01 19 23 LMP No, it's not. I ... - -

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00 01 19 24 CMP Why don't we just leave it there until I get a chance to take it down and play with it, because I have a place for it ... in.

00 01 19 30 LMP Okay.

00 01 19 34 CDR It's right on ... should start.

00 01 19 37 CMP Apparently, it's just the regulator. But the helium supply ... - -

00 01 19 41 LMP Well, they're afraid - -

00 01 19 42 CDR ... off.

00 01 19 43 LMP - - I think they're gonna give - afraid they're gonna give out of gas.

00 01 19 47 CMP Well, that's what I'm afraid of, too.

00 01 19 50 CDR It won't start up.

00 01 19 53 CMP ... Get it in?

00 01 20 14 CMP What time?

00 01 20 15 LMP ... 01:20.

00 01 20 29 CDR A little knowledge is a dangerous thing. I said, "The pressure looks good up here." They said, "Well, it ain't your pressure; it's the APS."

00 01 20 36 LMP Oh.

00 01 20 56 CMP How's everything up in this old panel look?

00 01 20 59 LMP Fine, Ken.

00 01 21 00 CDR This just looks downtown, Charlie and Ken.

00 01 21 02 CMP Yeah.

00 01 21 03 LMP Well -

00 01 21 04 CMP Well.

00 01 21 05 CDR Well.

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00 01 21 07 CMP Is it ever beautiful.

00 01 21 08 LMP It is ever beautiful.

00 01 21 18 CMP Oh, man.

00 01 21 19 LMP Yeah.

00 01 21 42 CMP I thought it ... - -

00 01 21 43 CDR You got it wrapped around ...

00 01 21 44 LMP Yeah.

00 01 21 45 CMP Hot dang.

00 01 21 46 LMP Okay. Twist the other one, Ken, because all the ... going around your back.

00 01 21 49 CMP Oh, I see what's happened. Yeah. The old ... Put it on one way, and ...

00 01 22 10 LMP What makes the helium pressure - would make it go up?

00 01 22 14 CDR The regulator failed to open.

00 01 22 21 CMP Did - did you get a picture of all that good stuff, John? I'm sure we got - -

00 01 22 28 CDR That's 10,000 pictures of horizons and sunrises. I got a picture of the Moon out there. ... coming up.

00 01 22 33 LMP It's gone.

00 01 22 34 CMP Going ... - -

00 01 22 35 CDR - - ... coming up.

00 01 22 36 LMP Supposed to be up.

00 01 22 48 CDR Okay, here's ... that's gonna get ... as about ...

00 01 22 54 CMP 2 ...

00 01 22 55 LMP What?

00 01 22 56 CMP 220, ... you think?

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00 01 22 57 LMP 210.

00 01 22 59 CDR All that ... right after insertion ...

00 01 23 07 LMP You can extend the docking probe if you want to.

00 01 23 10 CDR We gonna do that over the States?

00 01 23 12 LMP Well, they can't tell.

00 01 23 14 CMP Look under - -

00 01 23 15 CDR Want to hear it go "clunk?" Circuit breakers are in.

00 01 23 24 CMP Okay.

00 01 23 25 CDR Take that and put it somewheres else.

00 01 23 26 CMP Okay, shall we? EXTEND/RELEASE. Cover.

00 01 23 36 LMP There it goes.

00 01 23 37 CDR ... what it does.

00 01 23 38 CMP And the cabin pressure didn't go up?

00 01 23 40 CDR ...

00 01 23 41 CMP Oxygen flow ... go up. That's also very nice.

00 01 23 44 LMP Did you get the ... through?

00 01 23 45 CMP No, I just want to make sure it doesn't. Every time I do something mechanical on the spacecraft, I ...

00 01 23 53 LMP Okay. Did you go to - -

00 01 23 54 CDR Just about - -

00 01 23 55 LMP Did you go to RETRACT?

00 01 23 56 CMP Okay. ... two gray, just like they told me. Back to -

00 01 24 10 CDR ... supposed to leave it there.

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00 01 24 12 CMP Looks like we leave it in RETRACT, all right. Talkback gray at full extension. Did all those things. That's all did [sic]. (Sigh) Got all that stuff unstowed. And hold us on a hold attitude. That means I got to ..., damp the rate. If we do it, we'll do it with a - I'll make the turnaround in E and M [?]; then we'll go to SCS - Yes, because with the - the proportional control, I can set up a rate that's equivalent to the ... one. Okay.

00 01 24 59 CDR Lift that ... up ...

00 01 25 01 LMP Well, yeah. Well (laughter).

00 01 25 04 CDR Have to do it ...

00 01 25 07 CMP The thing I don't want to do is that I don't want to be talking about what we're gonna do and - when they're saying, hurry up and get over there before you lose attitude.

00 01 25 16 LMP Yeah. Did you put the Flight Plans in R-12, Ken?

00 01 25 18 CMP You should have volume 1 in here.

00 01 25 20 LMP Okay.

00 01 25 21 CDR ...

00 01 25 22 CMP Okay. Why don't you pull that out? Well, you remember we talked about it?

00 01 25 26 CDR Yeah, I remember that.

00 01 25 27 CMP We went over the procedures on how to dock the thing in ... - -

00 01 25 28 CDR Yeah.

00 01 25 29 CMP - - because you get there faster - -

00 01 25 30 LMP Well, I hate to tell you, but I forgot to hook up R-12, and ...

00 01 25 32 CMP I'll go get it.

00 01 25 33 CDR It's just floating. Just reach around there, and it will just float right up.

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00 01 25 35 CMP Okay. Sometime here, before we hit the States or something, I sure would like for us to recap the checklist to make sure we haven't left something out.

00 01 25 42 LMP I've gone over it three times.

00 01 25 44 CMP Oh, you have?

00 01 25 45 LMP Yeah.

00 01 25 46 CMP Okay.

00 01 25 47 LMP Based on the - our -

00 01 25 49 CMP Okay, I just wanted to make sure that I - you know, there's some - some of my things that I didn't do because you did, and I don't have all of my stuff checked off, I'm sure.

00 01 25 58 LMP Okay, you want me to get the Flight Plan out?

00 01 26 00 CMP Yeah, I wrote some things in there. I think I got some camera settings ...

00 01 26 06 CDR 01:28, we come up ... States.

00 01 26 08 CMP 01:18?

00 01 26 10 LMP 01:28. Here you go, Ken.

00 01 26 12 CMP All right. Thank you.

00 01 26 19 CDR (Singing) Dum-do-da-dum-da-dee-do-dee-do-do.

00 01 26 31 LMP 01:26. Sure is quiet up here.

00 01 26 42 CMP It sure is. Okay, ... one coming at ...

00 01 27 05 CMP Okay, at 01:30 - Just couldn't believe that these ..., and I'm already so baffled by these things that I wanted to remember about that I need to do. I was trying so hard to remember times and things; and there just wasn't any way.

00 01 27 25 LMP Well, I'll tell you, all I was doing was holding on to that ascent ...

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Day 1

00 01 27 28 CMP Man, when that thing started to shake (laughter) -

00 01 27 31 CDR Oh, ... at staging?

00 01 27 33 LMP No.

00 01 27 34 CMP No. The -

00 01 27 35 CMP/LMP Lift-off.

00 01 27 36 CMP Just in general.

00 01 27 37 CDR Oh, I mean, that's for sure.

00 01 27 40 CMP Well, it's just like everybody said. They said it's like being on a freight train on a rough track. (Laughter) That's really weird. And when the - -

00 01 27 51 CDR The only thing that I didn't recognize was - there was a little ripple of pogo that kind of built up and died out to - to - to about 09:07 in the S-II burn, and then it quit at - and then after - after the engine shut down, I felt a little pogo.

00 01 28 07 CMP After the engine shut down, you felt pogo?

00 01 28 08 CDR After center engine shutdown.

00 01 28 10 CMP Oh, in the S-II?

00 01 28 11 CDR Yeah.

00 01 28 12 CMP Yeah, it quit at 09:05. I remember that number.

00 01 28 14 CDR Yeah, 09:07.

00 01 28 15 CMP And it was - Yeah. And it was - the thing that bugged me was that the pogo or the buzz that we got in the S-IV was the same frequency; makes me think maybe that was coming from, not from the booster, but from the understage or something like that. Because it was a - I would have expected to, you know, to get a frequency change, wouldn't you?

00 01 28 40 CDR ... I wouldn't even think about it anymore. Okay, there's the coast of - of Baja.

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00 01 28 48 LMP Yes, sir.

00 01 28 52 CMP Look at him out there ahead.

00 01 28 54 LMP Look. Yeah, way ahead.

00 01 28 58 CDR You know that center window isn't too good for that. Charlie, do you want to see if you get to take a pic - picture, or do you think it's worthwhile?

00 01 29 06 LMP Well, I don't know.

00 01 29 09 CDR Huh? I got so much junk in the window, I can't do it.

00 01 29 13 CMP Like my ...

00 01 29 14 CDR Yeah. Very good.

00 01 29 15 LMP Yeah, give me - give me the camera.

00 01 29 17 CDR Yeah, well, I got it set up at f/11, infinity - -

00 01 29 21 CMP Okay, how about let's record the - what you take pictures of and things like this and all that ... and how to do it.

00 01 29 25 LMP Yeah, well, here comes - -

00 01 29 27 CMP You took - did you just take one, John?

00 01 29 29 CDR No, I took two, one of which was the - No, that was the - it was the thunderstorm that really attracted me down there - -

00 01 29 38 LMP Okay, that's Baja down there.

00 01 29 40 CDR Yeah.

00 01 29 43 CMP Why don't you read off and tell me what you got there, Charlie?

00 01 29 45 LMP Okay, frame count number ... - -

00 01 29 47 CDR You got signal strength yet?

00 01 29 48 LMP Not yet.

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00 01 29 49 CMP You on the right antenna?

00 01 29 51 CDR ... now.

00 01 29 52 LMP Yeah, well, I don't know.

00 01 29 54 CMP Well, let's do that the first ...

00 01 29 55 LMP Well, we have it - orb rate. We ought to be -

00 01 29 59 CMP We ought to be on the top one, or we ought to be on B or D.

00 01 30 05 LMP We're on B ...

00 01 30 10 CMP All right. ... we get it. We get a signal right now.

00 01 30 19 LMP It's about a minute late.

00 01 30 31 CDR You got our VHF's going?

00 01 30 33 LMP ...

00 01 30 42 CDR No signal strength, huh?

00 01 30 44 LMP Not a thing.

00 01 30 54 LMP Look at that. That ...

00 01 30 57 CDR I don't worry about any jet. Let's worry about a little comm here. ...

00 01 31 02 LMP There it comes. There it comes.

00 01 31 05 CDR Hello, Houston. Are you there?

00 01 31 07 LMP Be - Let them get locked up, John.

00 01 31 11 CDR Now you got signal strength; they ain't locked up yet.

00 01 31 13 LMP Well, it's coming up MAX now. Okay, you should have them.

00 01 31 21 CDR Houston, 16.

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## TIME SKIP

00 01 48 38 CDR Put it to the side and ... right there. ... like  
- ...

00 01 48 44 LMP Could you - you switch to G&C and do a VERB 46 and  
drive around a little while?

00 01 48 48 CMP We've already got a VERB 46. That's standard ...  
I was just curious if you had tried -

00 01 48 55 LMP No. No. I really ...

00 01 48 57 CMP Okay. I'm not advocating that you do.

00 01 49 00 CDR Okay.

00 01 49 03 CMP I would rather see that we do the most nominal  
things that the world has ever seen.

00 01 49 07 CDR You better believe it.

00 01 49 09 CMP But if we do something off of that, I just thought  
it would be nice to record it. What we found out.  
That's all. ...?

00 01 49 18 LMP Yeah.

00 01 49 19 CMP ... have to ... it.

00 01 49 20 LMP I could sure use a drink of water, but I sure  
don't want to - -

00 01 49 22 CMP Want me to get it for you?

00 01 49 23 LMP Yeah. But I don't want to - -

00 01 49 24 CMP Okay?

00 01 49 25 LMP No, I'll get it.

00 01 49 26 CMP Hey, look, you don't have to.

00 01 49 27 LMP Okay.

00 01 49 30 CDR Yeah, let's all take a drink of water.

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Day 1

00 01 49 32 CMP Here. I'll put the binocs up.

00 01 49 34 CDR Okay. We'll have to stick this in that bag, wherever it is.

00 01 49 38 CMP Oh, I put it up - up here through TLI. Okay. How's that?

00 01 49 44 CDR We need it right after TLI ... - -

00 01 49 45 CMP Yeah, it won't be far away.

00 01 49 47 LMP How about just on the Velcro over here?

00 01 49 49 CMP I'd like to tighten this down.

00 01 49 50 CDR For launch, it should be up somewhere, Charlie, because I think ... burns 5 minutes of engine, you get up to darn near two-thirds of a g.

00 01 49 58 LMP Well, I was gonna put it on the shelf - girth shelf, on the Velcro.

00 01 50 00 CMP Well, but it might - if you got an attitude excursion - -

00 01 50 03 LMP Okay.

00 01 50 06 CC ... Houston through Canary.

00 01 50 08 CDR Loud and clear, Gordon.

00 01 50 13 CC You're a little - a little down in the mud, but I think I can understand you.

00 01 50 20 CDR Okay.

00 01 50 23 LMP Hey, Gordy, we heard you then before we got the signal strength. That must have been on the - -

00 01 50 26 CDR VHF.

00 01 50 27 LMP - - VHF, huh?

00 01 50 31 CC You are clear but weak.

00 01 50 39 LMP Okay, we got - we got ...

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00 01 50 42 CMP Oh, look at that horizon! Isn't that pretty? You got one out your side, too, Charlie?

00 01 50 45 LMP Yeah.

00 01 50 46 CMP ...?

00 01 50 47 CDR Isn't that fantastic?

00 01 50 49 CMP (Laughter) ... Oh!

00 01 50 50 LMP Just as blue and pretty!

00 01 50 52 CDR Can't you imagine that ...

00 01 54 21 CDR ... open.

00 01 54 22 LMP ... went ...

00 01 54 23 CC 16, Houston. About 30 seconds to LOS. We figure to have you through ARIA at 02:22, a couple of minutes later than shown in the Flight Plan. Over.

00 01 54 33 CMP Roger. Understand.

00 01 54 36 CMP Did - did he ever say anything about why we got the thing late?

00 01 54 39 LMP You know that's - Hey, you know, this light's on out there, Ken. Is that supposed to be?

00 01 54 43 CMP What's that?

00 01 54 44 LMP On that thing?

00 01 54 45 CDR Whoops! Hmph. I didn't get my things on time.

00 01 54 48 CMP Let me see.

00 01 54 49 CDR Okay.

00 01 54 50 CMP Maybe I hit something. Boy, it gets ... in here.

00 01 54 54 CDR Yeah. Well, we might - Do you want to run into the TLI? We got a - we're at 01:55.

00 01 55 04 LMP Yeah. I'm going to go LOW BIT RATE, COMMAND RESET - ... COMMAND RESET. We better go into the TLI prep.

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00 01 55 17 LMP Okay, TRANSLUNAR, INJECT, verify?

00 01 55 20 CDR That's INJECT.

00 01 55 22 LMP Okay. EDS POWER on up?

00 01 55 24 CDR EDS POWER coming on up.

00 01 55 26 LMP Okay. Perform EMS DELTA-V test and null bias check.

00 01 55 30 CDR Okay.

00 01 55 33 LMP And set the DELTA-V<sub>C</sub>.

00 01 55 42 CDR 1586.5?

00 01 55 46 CMP 1586.5?

00 01 55 49 CDR Great.

00 01 55 51 LMP Okay, Ken, I guess you can call P15.

00 01 55 54 CMP All right. ...

00 01 56 21 CMP Okay. ... want? 61 ... 63?

00 01 56 24 LMP 63.

00 01 56 25 CMP Okay. ...

00 01 56 35 CMP Okay, Charlie.

00 01 56 36 LMP 2.

00 01 56 37 CMP 2.

00 01 56 38 LMP 23.

00 01 56 39 CDR Minus 18.9 on the DELTA-V test. That's pretty good, isn't it?

00 01 56 43 CMP ... particularly ... What's the next one?

00 01 56 47 LMP 20:57.

00 01 56 49 CMP 20:57, right? ...

00 01 56 53 LMP No, 57 ... 57. It's 67 seconds. ...

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00 01 56 58 CMP Okay, I got 02:23:57 ...

00 01 57 04 LMP Go.

00 01 57 06 CDR Now you run that for how much? 100 seconds?

00 01 57 08 CMP Yeah. Okay, 14 is the ... That was the time base 6 ... Isn't that right? Not the TLI.

00 01 57 16 LMP Time base 6 ... - -

00 01 57 17 CDR ... count 0.3 for every 5 seconds. ... count a tenth every 5 seconds. ...

00 01 57 26 CMP All right. Okay.

00 01 57 28 LMP It's this number right up here.

00 01 57 29 CMP Okay. I'd just - You know, I'd feel bad ... TLI.

00 01 57 33 LMP Yeah.

00 01 57 34 CMP Okay, NOUN 14 is ... cut-off. All right. Go on.

00 01 57 43 LMP  $V_I$ , you want 35589.

00 01 57 46 CMP Okay, 35589.

00 01 57 50 LMP Go.

00 01 57 58 CMP ... 35, 36.

00 01 58 02 CDR Do you do this for 100 seconds?

00 01 58 04 CMP ...

00 01 58 07 CDR Okay, well, there's a minute. Plus 100 ...

00 01 58 31 LMP What's that gurgling?

00 01 58 33 CDR Wait a minute. Okay. Wait a minute.

00 01 58 44 CDR 4, 3, 2, 1 -

00 01 58 48 CDR MARK it.

00 01 58 51 CMP ... two and a half; 100 seconds. ... 5 ... - -

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00 01 59 00 LMP What's our pitch attitude, John? You got the optics ... there?

00 01 59 04 CDR Yeah, full Moon.

00 01 59 05 CMP You got ORDEAL on that?

00 01 59 06 CDR Yep.

00 01 59 07 CMP ... hundred?

00 01 59 08 CDR Yeah; 95, actually.

00 01 59 10 CMP All righty.

00 01 59 11 LMP Okay. Set DELTA-V<sub>C</sub> ..., John.

00 01 59 13 CDR Okay.

00 01 59 14 LMP It's 10, 373.0.

00 01 59 25 CDR ... over there, Charlie.

00 01 59 27 LMP Got it.

00 01 59 29 CMP ..., Charlie?

00 01 59 30 LMP Oh, yeah. Look - look, John.

00 01 59 31 CDR What?

00 01 59 32 LMP The fires. Out the right side. Looka there! They were right. They were really right.

00 01 59 38 CDR What's that?

00 01 59 39 LMP Beautiful!

00 01 59 40 CMP The fires of Africa. They're there. Like he said. Isn't that spectacular?

00 01 59 42 LMP That is really beautiful!

00 01 59 45 CMP Can you see them, John?

00 01 59 46 CDR Yeah, I see them. Yeah, yeah.

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00 01 59 48 LMP ~~CONFIDENTIAL~~.

00 01 59 49 CDR Good gosh!

00 01 59 52 LMP There must be a hundred or so.

00 01 59 54 CMP ... over there.

00 02 00 05 LMP What are they from?

00 02 00 07 CMP Nomads.

00 02 00 09 LMP And - and there's brush fires, sometimes.

00 02 00 12 CMP Mostly, I - you know there's the - all the nomads and stuff that are out there ... around.

00 02 00 20 CDR One zero - What did you say it was, Charlie?

00 02 00 22 LMP 10, 373.0. Man, you can see them out here, I'll tell you.

00 02 00 30 CMP Are they ...?

00 02 00 31 LMP Yeah. I think they are.

00 02 00 32 CMP Okay, you're looking -

00 02 00 33 CDR ...

00 02 00 34 CMP Well, you're looking north.

00 02 00 35 LMP North, yeah. I see some thunderstorms. Wow! Look at that! The ones ... there - -

00 02 00 39 CDR 10, 37 - -

00 02 00 40 CMP ...

00 02 00 42 LMP Yeah, 10, 373.0.

00 02 00 45 CDR ... 37 ... - -

00 02 00 46 LMP Okay, check the DAP, Ken.

00 02 00 48 CMP Okay. You just want me to verify it?

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00 02 00 51 LMP Well, it says load 310 - -

00 02 00 54 CMP Okay, ... - -

00 02 00 55 LMP - - 31 - point 11.

00 02 00 59 CMP 31.0, 0.11.

00 02 01 03 CDR Okay. 10, 373.0.

00 02 01 06 LMP That's good. Okay. GDC align.

00 02 01 10 CDR Okay.

00 02 01 17 LMP Do you want to hold off on the power until Carnarvon LOS?

00 02 01 21 CDR Okay.

00 02 01 22 CMP We got the DELTA-V test and ...

00 02 01 35 LMP I've never seen so many storms ...

00 02 01 43 CMP ... have a thunderstorm, ... be ... usually. The - the ... thunderstorm.

00 02 01 47 CDR (Laughter)

00 02 01 52 LMP I don't ... Wonder if that's not one of those fires.

00 02 02 11 LMP Okay. Set ... Did you do a VERB 83?

00 02 02 14 CDR No. I aligned the GDC ...

00 02 02 16 LMP Okay.

00 02 02 18 CDR That's really going to be a hassle.

00 02 02 20 LMP Yeah, I know.

00 02 02 37 CDR Okay.

00 02 02 39 LMP Okay, do a VERB 83.

00 02 02 40 CDR You really want one of those, huh?

00 02 02 41 LMP I'd ...

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00 02 02 42 CDR (Laughter)

00 02 02 43 LMP Yeah, I'm reading the checklist.

00 02 02 45 CDR We already loaded P15.

00 02 02 47 LMP Okay.

00 02 02 48 CDR We got the - we got the ORDEAL SET.

00 02 02 51 LMP Okay. TRANS CONTROL POWER, ON.

00 02 02 54 CDR Okay.

00 02 02 55 LMP And bypass the SECS PYRO ARM.

00 02 02 57 CDR Okay.

00 02 03 00 LMP ROT CONTROL POWER NORMAL, two, AC/DC, verify.

00 02 03 03 CDR Verify.

00 02 03 04 LMP ROT CONTROL POWER DIRECT, two, MAIN A/MAIN B.

00 02 03 07 CDR MAIN A/MAIN B.

00 02 03 09 LMP SPACECRAFT CONTROL, SCS, verify.

00 02 03 11 CDR Verify.

00 02 03 13 LMP LV/SPS INDICATOR, S-IVB.

00 02 03 16 CDR S-IVB.

00 02 03 17 LMP CB, DIRECT ULLAGE, two, close.

00 02 03 24 CMP You don't want to monitor the - ... you want to do that? ...? ...

00 02 03 31 CDR Yeah, that's what I was doing.

00 02 03 33 CMP ... should be all right.

00 02 03 39 CDR It goes back to whatever it was, doesn't it?

00 02 03 43 CMP ... ought to be able to call ...

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00 02 03 47 CDR I don't want to experiment with that, particularly. ... I don't know whether we ever did or not, to be honest with you, Ken.

00 02 03 54 CMP Well, I - that's why I asked. That's one that I don't - -

00 02 03 57 CDR I don't remember even ever doing that.

00 02 04 02 CMP Let's not then.

00 02 04 04 CDR Yeah.

00 02 04 05 CMP It's tough when you ...

00 02 04 09 LMP Did you get the DIRECT ULLAGE C breaker, John?

00 02 04 11 CDR Yeah, I got them, Charlie.

00 02 04 12 LMP Okay. Set the DET to 51 minutes.

00 02 04 15 CMP You got them there, didn't you? ...

00 02 04 19 CDR Yeah. DET to 51 minutes. Okay, going to RESET, 2 hours and 4 minutes.

00 02 04 35 CMP It won't start?

00 02 04 36 CDR ...

00 02 04 37 CMP Oh.

00 02 04 39 LMP Okay, at 56 minutes, John, we got to change the slew FDAI number 1 to ... equals 16.

00 02 04 56 CDR ... equals 16.

00 02 04 59 LMP ...

00 02 05 13 CMP It really isn't like I - I don't know, the way I - I thought it would - would be after ... It just feels like I've been here forever.

00 02 05 20 CDR Yeah, I agree.

00 02 05 22 LMP I must admit, I feel like I'm ...

00 02 05 26 CMP I don't even feel that. I'm just - -

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00 02 05 28 CDR My sinuses are all stuffed up - getting worse.

00 02 05 30 LMP Mine, too.

00 02 05 34 CDR I think my nose is, you know, just about to drain.  
... (Laughter) ...

00 02 05 48 CMP Okay, you guys, you better start ... out your  
belts, because they could get in the way.

00 02 06 00 LMP Can you -

00 02 06 04 CDR Not with the seat down, you can't, Charlie.

00 02 06 07 LMP Well, I'm gonna leave the seat down, okay?

00 02 06 09 CDR Sure. ...

00 02 06 48 LMP Man, that booster ... ride. I can't get over that.  
It really felt like a runaway freight train!

00 02 06 57 CMP I thought that ... was pretty impressive.

00 02 07 00 CDR I saw that big flash of flame out that window, and  
I flat forgot that it was ... Man, I thought I'd  
take this old arrhythmia gage - -

00 02 07 10 CMP Right. That was pretty bad.

00 02 07 14 CDR (Laughter) Either that or it'd absolutely stop  
(laughter). Golly, I was just - I was all prepared  
for the shock ... separation - -

00 02 07 21 LMP Is ... is on? ...

00 02 07 25 CDR I'll go look. I didn't really know that.

00 02 08 02 LMP ..., John.

00 02 08 04 CDR I told you I'd forget. Man, I'm forget - I'm in a  
rapid dump mode. I'm forgetting faster than I ...  
Okay; 25 minutes to go again.

00 02 08 21 LMP Attitude looks okay?

00 02 08 23 CDR Looks super.

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00 02 08 31 LMP Man, I can't get over that ... (laughter) ... I tell you, there are a lot of - -

00 02 08 40 CDR ... gonna leave them checklists up there during the boost?

00 02 08 42 CMP Okay, I'm getting to them. My next course of action ... is to go around and see what I got laying ...

00 02 08 48 LMP Okay, we got a lot ...

00 02 08 53 CDR You want to eat a sandwich, you guys? We got about 10 minutes here.

00 02 08 56 LMP Not me; I'm gonna wait until later.

00 02 09 01 CDR ... Okay. I don't want y'all to get hungry and starve. ...

00 02 09 21 CMP I'll have to admit, when you get up here - I always thought that EL [?] was kind of a silly ... but when you get up here, it sure is different.

00 02 09 26 LMP Sure is.

00 02 09 28 CMP It just ... Don't you guys have a little - little ... thing on the - -

00 02 09 32 CDR ... - -

00 02 09 34 CMP You can't see it?

00 02 09 35 CDR - - ... confuses me. Okay, 10, 272. Right, Charlie?

00 02 09 40 LMP That's right. ...

00 02 09 45 CDR Okay. What's the fuel-to-oxidizer DELTA-P?

00 02 09 48 LMP Hey, could you get me a little piece of tape ...?

00 02 09 51 CDR ... What's the fuel - allowable fuel-to-oxidizer DELTA-P with this thing? On powered flight.

00 02 09 57 CMP On powered flight is 30 - greater than - it's greater than 36; OX over fuel, greater than 26.

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00 02 10 04 CDR Okay.

00 02 10 07 CMP If LOX goes greater than 50, you want emergency sep.

00 02 10 09 CDR When is the - when does ... - when does old what-youcallit predict when we ought to list this stuff down. Write all these numbers down so we ..., Charlie.

00 02 10 22 LMP Man, they didn't give me nothing but a pen.

00 02 10 26 CDR ... Give me time base 6 - -

00 02 10 27 LMP You know where a pencil is?

00 02 10 28 CDR - - ..., Charlie.

00 02 10 29 LMP Okay, time base 6 started at 02:23 -

00 02 10 35 CDR Okay.

00 02 10 36 LMP Wait a minute; 02:23:57, I think it was.

00 02 10 39 CDR ...

00 02 10 42 LMP 02:23:57.

00 02 10 44 CDR 02:23:57.00?

00 02 10 46 LMP Yes.

00 02 10 47 CDR Okay; and then R-2 align?

00 02 10 52 LMP R-2 align is 1 - 112.7.

00 02 10 57 CDR 112.7. ORDEAL operate time?

00 02 11 02 LMP 57:20.

00 02 11 05 CDR 57:20? Didn't they change that on us?

00 02 11 08 LMP That's what it's - that's what's the new time.

00 02 11 11 CDR Okay. And maneuver to the R-2 ignition would be what?

00 02 11 18 LMP Okay, 107. ORDEAL of 107.

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00 02 11 21 CDR Okay. And then they said something about ... data of 17 instead of 16, right?

00 02 11 27 LMP That's right, at 56 minutes.

00 02 11 30 CDR Okay. ...

00 02 11 32 LMP Okay, and at - and at 57:20, your insured is 11 degrees.

00 02 11 37 CDR 57:20 is 11, right? Okay, 11. Thank you. No wonder we ain't never got the right profile. And then they have - -

00 02 11 48 CMP ...

00 02 11 51 CDR  $V_I$  is what?

00 02 11 54 LMP  $V_I$  is 1 at 35589.

00 02 12 02 CDR And burn time? ... - -

00 02 12 05 IMP 05:43.

00 02 12 09 CDR Okay. ...

00 02 12 20 CMP Well, I don't see what's back here that's not battened down. ... up here; ... over there.

00 02 12 30 CDR Well, I'll try to take this camera ... How will that be?

00 02 12 33 CMP Take the camera off?

00 02 12 35 CDR Yeah. We can put it on ...

00 02 12 42 CMP ...?

00 02 12 44 CDR Okay, going back to 12. There you go.

00 02 12 52 CMP Okay. We've ... TLI preparation?

00 02 12 54 LMP ... to SECS PYRO ARM.

00 02 13 02 CMP Can you make a good place to put that Flight Plan there? Guess I could put it there myself.

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00 02 13 07 CDR Right.

00 02 13 10 CMP Okay - -

00 02 13 11 CDR Well, let's see here, now. Again, we got the CSM/LM SEP breakers ...

00 02 13 18 CMP We do?

00 02 13 19 CDR Yeah. There we are. SECS PYRO ARM really is a sort of a ... for docking ...

00 02 13 30 CMP Be kind of terrible ...

00 02 13 34 CDR It's got CSM/LM SEP switch and then S-IVB/LM SEP switch. We got to be very sure we're pushing the right one ..., but anybody can look at it.

00 02 13 45 CMP We're going to all look at that, aren't we?

00 02 13 46 CDR Yes. We're all going to ... - -

00 02 13 47 CMP Three, 4, and 5 - 5-second hold. Then we're gonna make sure we got the circuit breakers in. All ...

00 02 14 07 CMP Might as well take my water wings off. What'll I do with them?

00 02 14 13 LMP ... go?

00 02 14 15 CMP Right down here. ... you?

00 02 14 16 CDR Let me turn the ...

00 02 14 20 LMP Okay, ...

00 02 14 24 CDR Yeah, we - we thought we was supposed to PRO there.

00 02 14 26 LMP ...

00 02 14 30 CDR That's okay.

00 02 14 34 MS That's low ... - -

00 02 14 35 LMP I just got a ... - -

00 02 14 36 CMP ... get any ...

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00 02 14 38 CDR Yeah. ... all out. I don't know how you're ever gonna make it with that couch in there, if you don't ... to take the couch out ... (laughter).

00 02 14 55 LMP One thing about the ... especially ..., I got one little minor ... and that's ...

00 02 15 04 SC (Laughter)

00 02 15 08 CMP You know, you don't look fat faced to me.

00 02 15 09 LMP I don't? I feel a little ...

00 02 15 13 CDR It looks like - well, you - you - -

00 02 15 14 LMP What?

00 02 15 15 CDR Yeah, you look like you're ... hat.

00 02 15 33 LMP It's natural.

00 02 15 34 CDR I mean, but it's not near as bad as standing on your head. That's what I did for 2 or 3 days. Stood on there for 10 minutes, and, boy, that's about 10 minutes ... Seemed like about - I'll tell you what's just as bad as standing on your head, though. ... got a couple or three ... Mine keeps going - it keeps - -

00 02 15 43 CMP Keeps going ...?

00 02 15 45 LMP What, your sinuses?

00 02 15 47 CDR Yeah. And then it goes away.

00 02 15 48 LMP Yeah.

00 02 15 49 CMP Yeah, I suspect ... tomorrow.

00 02 15 51 LMP Mine really can drain. ...

00 02 15 54 CDR There's nothing else they can do. But the zero g is sure neat (laughter).

00 02 16 03 CMP Freddie Baker's [?] simulator was never like this one.

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00 02 16 05 CDR Boy, I mean to tell you.

00 02 16 07 CMP I wouldn't have ..., if I was ...

00 02 16 10 LMP I hate to tell you, but they don't have any ARIA AOS in this.

00 02 16 14 CDR It's 02:22 is what he said, Charlie.

00 02 16 26 LMP I couldn't get my helmet back down in there. ... Down under there. There you go.

00 02 16 37 CMP Okay. Now that's - The only thing we got that I'm a little leery about is the camera.

00 02 16 42 LMP It's supposed to be mounted there.

00 02 16 43 CMP Okay. You want to leave it there?

00 02 16 44 LMP Yeah.

00 02 16 45 CMP ...?

00 02 16 46 LMP Yeah, I think so.

00 02 16 47 CMP Okay, we got the Hasselblad.

00 02 16 48 LMP Okay.

00 02 16 49 CMP I've got it up in R-2. And you got the TV monitor. Is it gonna be all right?

00 02 16 53 LMP Yeah; well, yeah, I think so. It's on the shelf and it's on a big piece of Velcro.

00 02 16 57 CDR ... is all in there.

00 02 16 59 CMP You got the COAS locked ...

00 02 17 09 LMP (Laughter) Man, we're going to the Moon.

00 02 17 11 CDR Well, we ain't there yet, babe. We got ... to do it. A couple of things you got to do.

00 02 17 17 CMP A couple of things you got to do.

00 02 17 18 LMP I know it. I know it.

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00 02 17 19 CDR And then Casper will be out of his bag.

00 02 17 28 CDR I'll tell you, if this isn't the cat's meow if I've ever saw it.

00 02 17 34 LMP You know, I'm getting used to it. My head's not feeling so poorly.

00 02 17 37 CDR Okay. It goes up and then it goes back down again. Don't ask me how the head compensates for it, because - The sinuses, I don't see how they can ever drain. ... doctors ... It doesn't know it can't compensate.

00 02 17 54 CMP ... checklist. ... G&C Checklist ... there.

00 02 18 05 CMP Aw, beautiful. It's got the little card.

00 02 18 06 LMP You know the - the dadgum - the flow ain't exactly ...

00 02 18 16 CDR I ain't got much flow, either.

00 02 18 18 LMP It beats me.

00 02 18 19 CDR Well, the - these extension hoses would make it better, Charlie ... - -

00 02 18 22 LMP Well, I don't want to do it now.

00 02 18 24 CDR That's really the only thing.

00 02 18 25 LMP That's okay. I'll do it after ...

00 02 18 29 CMP I did it. It's pretty comfortable. It's cool. You want me to turn yours off? ...

00 02 18 38 CDR Okay.

00 02 18 40 LMP How much time we got?

00 02 18 41 CDR ... What was time base 6 predict?

00 02 18 47 LMP 02:23:37.

00 02 18 50 CDR ...

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00 02 18 54 LMP Why don't you turn my - could you slide up - go right up there and turn my flow on, Ken.

00 02 19 00 CMP ... get the top one.

00 02 19 01 LMP Okay, ...

00 02 19 05 CDR Can't do it if you don't ... strapped in.

00 02 19 06 CMP ...

00 02 19 12 CDR Okay. EMS DELTA-V test, set DELTA-V, DIRECT ULLAGE, two, close - -

00 02 19 16 CMP Here you go, Charlie.

00 02 19 17 CDR - - UP TELEMETRY to BLOCK, that's BLOCK - -

00 02 19 18 LMP Okay.

00 02 19 19 CDR - - EDS POWER is ON, Charlie. Okay, Charlie; I'm gonna arm the pyros. Charlie?

00 02 19 26 LMP Wait a minute. You want to put your hose around through there? Okay, go ahead, John.

00 02 19 33 CMP John, you want to do yours while I'm here?

00 02 19 35 CDR Nah.

00 02 19 36 LMP Okay. I'm ready on the pyros.

00 02 19 38 CDR Okay, pyros are coming on. PYRO A, on; PYRO B, on.

00 02 19 43 LMP Okay.

00 02 19 44 CDR THC, it's on. RHC - what do they want to do with it?

00 02 19 50 LMP ... Okay, wait a minute. THC - TRANS CONTROL POWER - we need ROT CONTROL POWER DIRECT, two, MAIN A/MAIN B - should have already had all that.

00 02 20 00 CDR Yeah. DIRECT, two, MAIN A/MAIN B. Go.

00 02 20 02 LMP Okay, two - NORMAL, two, AC/DC.

00 02 20 05 CDR Go. SPACECRAFT CONTROL to SCS.

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00 02 20 08 LMP Okay. We got that.

00 02 20 09 CDR LAUNCH VEHICLE GUIDANCE is IU. TRANSLUNAR INJECT, INJECT. Set DET to 51 minutes. Okay.

00 02 20 18 CMP Hey, is that tool E gonna stay up there, John? It's right over your head - -

00 02 20 22 CDR ... Okay.

00 02 20 24 LMP Yeah, it'll stay up.

00 02 20 25 CMP Okay.

00 02 20 26 CDR I thought I ... - -

00 02 20 27 CMP ... Okay, why don't I put it in my pocket. Here, I'll wrap it. I'll put it in my pocket.

00 02 20 33 LMP We've got an evaporator problem here. No, I guess we don't.

00 02 20 37 CMP You've got the radiators on, haven't you?

00 02 20 38 LMP Yeah. ...

00 02 20 44 CDR Here you go.

00 02 20 46 ARIA ...

00 02 20 47 LMP ... ARIA - -

00 02 20 48 CDR ... a little rough there.

00 02 20 49 ARIA ...

00 02 20 51 LMP ... antenna ... That was ARIA calling.

00 02 20 56 CDR I know.

00 02 20 57 LMP ... think they must be ...

00 02 21 03 CDR Yeah.

00 02 21 04 CMP Hey, you want to check to see that that's going to be all right.

00 02 21 06 CDR Yeah, it's all right.

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00 02 21 07 CMP You might make sure that these shoulder straps aren't laying - floating somewhere where they get over your head - -

00 02 21 12 LMP Mine are tied down - -

00 02 21 13 CDR ... are down.

00 02 21 14 CMP Okay, because those clips are just ...

00 02 21 17 CDR Okay. I'm gonna set 300 LUNAR on this ... .. to do it.

00 02 21 25 CMP All right.

00 02 21 26 LMP Okay, a couple of minutes, you guys.

00 02 21 28 CDR 300 and LUNAR, we got set on it.

00 02 21 30 LMP ...

00 02 21 37 CDR We - we got signal strength?

00 02 21 38 LMP Yeah, a little bit - -

00 02 21 39 CMP Here we go.

00 02 21 40 LMP - - ... keeps babbling, though. ... locked up yet. We'll let them give us a call.

00 02 21 52 CDR Okay, Houston, through the ARIA. We got signal strength and - assume you're down there somewheres.

00 02 21 59 ARIA ...

00 02 22 09 LMP Typical ARIA. Hey, that's a lot cooler, Ken.

00 02 22 15 CDR Okay, Houston; we don't read anything you say, but we'll transmit in the blind.

00 02 22 20 ARIA ...

00 02 22 24 LMP Think they're having trouble locking up.

00 02 22 25 CDR ..., Charlie.

00 02 22 27 LMP Try them now. ...

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00 02 22 30 CDR How do you read that down there now, Houston?

00 02 22 36 CC Apollo 16, this is Houston through ARIA. Over.

00 02 22 40 CDR By gosh, loud and clear there.

00 02 22 44 CC So are you, John.

00 02 22 50 LMP Okay, we'll stand by for the light.

00 02 22 53 CDR What time?

00 02 22 54 LMP 09:38. About a minute.

00 02 22 58 CC How's everything on board?

00 02 23 01 CDR Everything looks good here. We're a minute - we're 10 minutes and 30 seconds to the burn.

00 02 23 09 CC ...

00 02 23 13 LMP What's that black thing over there, Ken?

00 02 23 15 CMP It's your neckband.

00 02 23 16 LMP Oh. ...

00 02 23 23 CMP You got the Flight Plan ...

00 02 23 24 LMP Yep.

00 02 23 25 CMP All put up.

00 02 23 30 CDR When is this up-link on? Up-link activity light on?

00 02 23 34 LMP That ...?

00 02 23 35 CDR Yeah.

00 02 23 36 LMP Okay, that and the S-II light come on at 09:38.

00 02 23 38 CDR Okay.

00 02 23 49 CDR Does that time base 6 start at 09:38?

00 02 23 53 LMP Yeah, minus 09:38.

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00 02 23 59 CMP ...

00 02 24 00 CDR Okay. On time for time base 6.

00 02 24 03 LMP Okay, stand by to start it.

00 02 24 04 CC Roger.

00 02 24 07 CDR You start it on that.

00 02 24 08 LMP At 9 min - yeah, okay.

00 02 24 09 CMP Yeah. Yeah, that will be ... - -

00 02 24 12 CDR This was - this is at ...

00 02 24 13 CMP - - that ... was at 09:30 - 5, I get. 36.

00 02 24 20 CDR Yeah, 36.

00 02 24 21 CMP Okay.

00 02 24 29 CMP Come on, boy.

00 02 24 38 CMP That was on time.

00 02 24 39 CDR Yeah, that was on time.

00 02 24 40 CMP Now, I don't understand that - -

00 02 24 41 CDR - - ... No, I don't understand it either, but I guess we'll ... - -

00 02 24 45 LMP Okay, Houston. The S-II SEP light was out on time.

00 02 24 50 CDR Charlie, ... - -

00 02 24 51 CC Roger; very good.

00 02 24 54 CDR Get this ball lined up?

00 02 24 55 LMP What, John?

00 02 24 56 CDR We were off - -

00 02 24 57 CMP Yeah.

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00 02 24 58 CDR - - ... on ...

00 02 24 59 CMP Yeah.

00 02 25 00 CDR Roll is - -

00 02 25 01 LMP Okay, John. Okay. Let see, you can monitor the tank pressures. Nominal LOX, 40; LH<sub>2</sub>, 31.

00 02 25 12 CDR ... 148, about?

00 02 25 17 CMP No. No, we're below that, John. 146 - let's say 146.

00 02 25 26 CDR Okay.

00 02 25 38 CMP Okay.

00 02 25 40 CDR Okay, now let's go over this thing here. What should I have on - -

00 02 25 43 LMP I got a couple of things for you.

00 02 25 44 CDR Okay.

00 02 25 45 LMP OR - DE - A - L - ORDEAL FDAI number 1, ORB RATE.

00 02 25 47 CDR It's ORB RATE, Charlie.

00 02 25 48 LMP 2, INERTIAL.

00 02 25 50 CDR 2, INERTIAL.

00 02 25 51 LMP ORDEAL MODE, HOOK - HOLD/FAST.

00 02 25 53 CDR HOLD/FAST.

00 02 25 55 LMP Okay, and go 300 LUNAR.

00 02 25 58 CDR We're in 300 and LUNAR.

00 02 26 00 LMP Okay, RHC number 2, armed - -

00 02 26 04 CDR ...

00 02 30 31 LMP ... the SCS TVC SERVO POWER, ... Okay?

00 02 30 34 CMP ... Yeah.

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00 02 30 35 LMP Okay, and that's on your card over there.

00 02 30 37 CMP Okay, and what's ... 5? ... - -

00 02 30 41 CDR ... five ... degree ... 25.

00 02 30 45 CMP Okay, and the shutdown, if it's - if it's ... control - TLI - if you overburn shutdown, you ...

00 02 30 53 CDR Okay.

00 02 30 56 LMP Okay, Ken - Excuse me. ... You want to do that for all the ...?

00 02 30 59 CMP Yes.

00 02 31 01 CDR Okay, we're in operating mode, gang.

00 02 31 06 CMP Okay.

00 02 31 07 CC 16, Houston, we're about LOS Carnarvon. Handing you over to ARIA. We'll watch the booster for you. The spacecraft's all yours.

00 02 31 16 CDR Okay; thank you much. Okay; now we're at - 57:45, Charlie.

00 02 31 24 LMP Okay; thank you.

00 02 31 26 CDR There's a couple of things here that's got to be -

00 02 31 28 LMP At 58:20, give me a call.

00 02 31 30 CDR All right, I'll call you at 58:20. What do we do?

00 02 31 35 LMP SCS TVC SERVO POWER, number 1, AC1/MAIN A; 2, OFF. And I go HIGH BIT RATE, RECORD, FORWARD, COMMAND RESET.

00 02 31 44 CDR And I go EMS MODE - -

00 02 31 46 LMP You go to NORMAL.

00 02 31 47 CDR Okay, that - that TVC SERVO POWERS number 1 gets power ...

00 02 31 49 LMP That's right.

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00 02 31 50 CDR Right.

00 02 31 51 LMP That's right.

00 02 31 52 CDR Okay, 15, 16, 17, 18, 19, 20, 21 -

00 02 31 57 CMP/LMP Okay, DSKY blanks.

00 02 31 59 CDR On schedule.

00 02 32 00 LMP Okay, SCS TVC SERVO POWER number 1, AC1/MAIN A; 2, OFF.

00 02 32 05 CDR 2, OFF.

00 02 32 06 LMP And we're going HIGH BIT RATE, RECORD, FORWARD, COMMAND RESET. Back to NORMAL. EMS MODE to NORMAL, John?

00 02 32 13 CDR EMS MODE to NORMAL. S-II SEP light's on on time.

00 02 32 17 LMP You should have ullage at 58:38.

00 02 32 21 CDR ... where the ullage is.

00 02 32 23 LMP Yeah (laughter).

00 02 32 24 CDR ... do we count?

00 02 32 26 LMP Look at the sunrise.

00 02 32 32 CMP ... clock there. ... would you like ...?

00 02 32 35 CDR No. ...?

00 02 32 39 LMP 02:33:35, John.

00 02 32 41 CDR 55 ...

00 02 32 59 CMP You want to turn your numerics up, so you can see them a little better?

00 02 33 01 CDR ...

00 02 33 10 CDR Okay; we got about - 25 seconds.

00 02 33 24 LMP Pressure's okay, John?

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00 02 33 26 CDR Yeah.

00 02 33 28 LMP Okay.

00 02 33 29 CDR At 59:55, we're going to be ...

00 02 33 32 LMP ... EMS.

00 02 33 35 CMP There it goes, you guys.

00 02 33 37 CDR Okay.

00 02 33 38 LMP There it goes.

00 02 33 39 CMP Outboards.

00 02 33 40 CDR IGNITION.

00 02 33 41 CMP Outboards!

00 02 33 42 LMP Boy, you don't miss that!

00 02 33 43 CMP You sure don't miss it (laughter).

00 02 33 45 CDR Okay. Something I missed -

00 02 33 48 LMP Something fell to the bottom of the -

00 02 33 49 CDR ... What do you do?

00 02 33 50 CC 16, we're showing good thrust on the S-IVB.

00 02 33 55 CDR Roger. Steer, baby, steer.

00 02 34 02 CMP Okay. It's steering right on, John.

00 02 34 08 LMP How's the tank pressures look?

00 02 34 10 CMP Fine.

00 02 34 11 LMP Good.

00 02 34 13 CDR That ... is ...

00 02 34 17 LMP We're passing the 40-seconds mark. That might have been a second or 2 behind.

00 02 34 25 CDR/CMP PU shift.

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00 02 34 27 CMP Boy, you feel that guy moving.

00 02 34 31 CDR One minute coming up.

00 02 34 34 CMP Our attitude is perfect.

00 02 34 35 LMP Okay, stand by on - pitch and roll.

00 02 34 37 CDR One minute - -

00 02 34 38 LMP MARK.

00 02 34 39 CDR - - Looks good.

00 02 34 40 CMP Okay; I've got - I've got us - oh, I've got us about 3 seconds early.

00 02 34 43 LMP Okay, ...

00 02 34 44 CC Roger. We're looking good here.

00 02 34 49 LMP We're about - my time, 3 seconds.

00 02 34 51 CMP Well, here. Let me give you a hack when I see - 01:30.

00 02 34 55 CDR Okay.

00 02 34 56 CC We've seen PU shift; the thrust looks good.

00 02 35 00 CMP Okay; well, I'm not sure this clock is right. Did it start on the time?

00 02 35 03 CDR I wasn't watching it, Ken.

00 02 35 06 CMP Well, I just want to know if there's difference at the mark.

00 02 35 08 LMP Okay; we're 1 second off.

00 02 35 10 CMP Okay.

00 02 35 19 CDR Okay, we're up to three-quarters g.

00 02 35 22 LMP It feels like the weight of the world's on my shoulders.

00 02 35 24 CDR Yeah, doesn't it feel good.

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00 02 35 25 CMP Wait'll you're at reentry - ... you could ...

00 02 35 40 LMP MARK. That was 2 minutes.

00 02 35 41 CDR Yeah.

00 02 35 42 CMP Man, we're following this thing today.

00 02 35 45 CC 16, Houston. At 2 minutes, looking good.

00 02 35 49 CDR Roger. Steering right on in here.

00 02 35 55 LMP About 42 - -

00 02 35 56 CC Roger.

00 02 36 03 CMP Okay, ...

00 02 36 09 LMP Pretty high - it's a high-frequency vibration.

00 02 36 12 CMP/CDR Yeah.

00 02 36 17 CDR Hitting 4 cycles per second ...

00 02 36 23 CMP ... come back and tell us something, for heaven's sakes.

00 02 36 31 LMP Okay; coming up on 3 minutes. (Cleared throat)  
One last chance to drain your sinuses.

00 02 36 39 LMP MARK - 3 minutes.

00 02 36 44 CDR Three-quarters of a g, Charlie.

00 02 36 46 LMP Okay.

00 02 36 48 CMP ... 3 minutes to burn.

00 02 36 53 LMP ... about right?

00 02 36 56 CDR Yeah.

00 02 36 57 CMP Yeah. ... at 03:13.

00 02 36 59 LMP Three - No, that wrong. Something -

00 02 37 01 CMP Boy, that calculation's way off.

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00 02 37 03 LMP Yeah.

00 02 37 05 CMP ... there. Something's wrong. ... 42 seconds.

00 02 37 12 CDR How does it look, Charlie?

00 02 37 14 LMP I'll give you a mark at 2 minutes.

00 02 37 15 CDR Okay.

00 02 37 16 LMP ... 43, 4, 5 -

00 02 37 21 LMP MARK; 2 minutes to go.

00 02 37 22 CMP Okay; it's converging.

00 02 37 23 LMP Yeah. It's converging. Rapidly.

00 02 37 35 LMP Stand by on 4 minutes -

00 02 37 39 LMP MARK - 4 minutes.

00 02 37 40 CMP There's 90 - -

00 02 37 41 CC 16, Houston through ARIA 3 now. Burn time is as predicted, 05:43. Everything looks good.

00 02 37 47 CDR Roger.

00 02 37 50 CMP Feels like you got pitch and yaw.

00 02 37 53 CDR Well, you're up to 1.

00 02 37 54 CMP And you can see those vibrations on the g-meter. Shaking ...

00 02 38 00 CDR Hold together ... That's bad.

00 02 38 05 LMP What's that?

00 02 38 06 CDR Like these ...

00 02 38 08 LMP MARK.

00 02 38 09 CDR ... could look at this.

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00 02 38 11 LMP 04:30. A minute to go. I'll give you a mark at a minute on the time.

00 02 38 16 CMP ... check - check this. It's going to a higher freq.

00 02 38 20 CDR Yeah.

00 02 38 21 LMP MARK.

00 02 38 23 CMP/CDR (Laughter)

00 02 38 24 CDR Oh.

00 02 38 25 LMP What was that?

00 02 38 26 CMP (Laughter) John's hand controller ... Coming up on 5.

00 02 38 33 LMP Coming up on 5 minutes.

00 02 38 39 LMP MARK; 5 minutes.

00 02 38 41 CC 16, everything looks good at 5.

00 02 38 44 CDR Roger.

00 02 38 45 LMP They aren't concerned about it.

00 02 38 47 CMP They don't see that.

00 02 38 48 LMP I guess they don't. Okay, ... - -

00 02 38 54 CDR ... and the steering for the angles.

00 02 38 55 LMP Within 30 seconds.

00 02 38 56 CMP ... counting them down.

00 02 38 59 LMP I'll give you a mark at 13 seconds.

00 02 39 03 CDR 600 feet to go.

00 02 39 06 LMP 40 -

00 02 39 07 LMP MARK; 13 seconds.

00 02 39 11 CMP ... on the FDAI.

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00 02 39 13 CDR 1.2, you guys. 41.

00 02 39 18 SC Whoo!

00 02 39 20 CDR SECO.

00 02 39 21 SC Whoo!

00 02 39 22 CDR Thank you. (Laughter)

00 02 39 23 CC Roger.

00 02 39 24 CMP Right on.

00 02 39 25 CDR Did I get it? I mean - see what it did.

00 02 39 26 CMP Yeah. That's good.

00 02 39 27 LMP I got - Okay.

00 02 39 29 CDR Okay. SECO right on time.

00 02 39 31 LMP It was a little early, John; 05:41.

00 02 39 33 CDR Yeah. I see it.

00 02 39 34 CMP Well, but this - -

00 02 39 35 CC Roger. Looks like normal shutdown and a guided cut-off.

00 02 39 38 CDR That's what it looked like - -

00 02 39 39 CMP Yeah, it was.

00 02 39 40 CDR We're looking at minus 10 on the DELTA-V<sub>C</sub>.

00 02 39 44 LMP Okay. TF - What's DELTA-V<sub>C</sub>? Minus 10?

00 02 39 46 CDR Yeah.

00 02 39 47 CC Roger.

00 02 39 50 LMP Man, all I can say - -

00 02 39 51 CDR How you gonna get back to that?

00 02 39 53 CMP You want -

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00 02 39 54 CDR What do you need?

00 02 39 55 CMP I need - -

00 02 39 56 LMP I need some times on - -

00 02 39 57 CDR You ... to record that stuff?

00 02 39 59 LMP  $V_G$ . What is  $V_G$ ?

00 02 40 00 CMP ...

00 02 40 05 LMP 34? 354?

00 02 40 07 CMP 432 - -

00 02 40 08 CDR Yeah, but what's that other - -

00 02 40 09 CMP That's - that's probably - -

00 02 40 10 CDR That's ... - -

00 02 40 11 CMP - - ... time.

00 02 40 12 CDR Yeah, that's what it is.

00 02 40 13 CMP And 55 - Gee, that's high.

00 02 40 17 LMP Yeah.

00 02 40 18 CDR You see it's converg - converting.

00 02 40 20 LMP/CMP Yes.

00 02 40 22 LMP Okay, at 08:26, we maneuver to orb rate, heads down. Okay, John, S - -

00 02 40 27 CMP Make a note there that those times are - -

00 02 40 28 CDR Okay. Go ahead, Charlie.

00 02 40 29 LMP Okay. SCS TVC SERVO POWER number 1, OFF.

00 02 40 31 CDR It's OFF.

00 02 40 32 LMP Going to LOW BIT RATE.

00 02 40 34 CDR EMS MODE, STANDBY.

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00 02 40 35 LMP EMS FUNCTION, OFF.

00 02 40 36 CDR OFF.

00 02 40 37 LMP SECS PYRO ARM, two, SAFE.

00 02 40 39 CDR Two, SAFE.

00 02 40 40 LMP FDAI number 1, INERTIAL.

00 02 40 42 CDR Number 1 is going to INERTIAL.

00 02 40 44 LMP Okay, lock your hand controller.

00 02 40 46 CDR ... should have done that first.

00 02 40 48 CC 16, Houston. If it's convenient, would you give us  $V_I$  at cut-off?

00 02 40 58 LMP Okay, Gordy, we got you a late time - Stand by.

00 02 41 04 CDR He cut it off - I thought you -

00 02 41 05 LMP No, huh-uh.

00 02 41 06 CMP No.

00 02 41 07 CDR What was that? That 35539 was what it was, wasn't it?

00 02 41 12 CMP Well, that's what it was counting to - that's when they said "It," and it quit.

00 02 41 14 CDR Okay, well, that's - -

00 02 41 17 CMP Gordy, we froze the display on the - V15 [?] displays - we were watching the countdown clock and when we got over to 64, it was already changed.

00 02 41 37 CDR Okay - -

00 02 41 38 CC Okay, Ken. We copied that, although you faded out at the end. We'll be up on Hawaii here at 44.

00 02 41 47 CMP Well, there's my first one.

00 02 41 48 LMP Okay, Gordy. We're down - we got the pyros safed and we're just about to go to P00.

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00 02 41 55 CDR We're in P00.

00 02 41 56 LMP We're in P00. And the - the - -

00 02 41 57 CC Charlie, you're just about unreadable. Copy that you're in P00, and we're standing by for Hawaii acquisition.

00 02 42 06 LMP Okay.

00 02 42 07 CMP Got to have that.

00 02 42 08 CDR Okay. You want to swap seats to get in ... - -

00 02 42 10 LMP Look at that horizon start to streak.

00 02 42 13 CDR You want to swap seats?

00 02 42 14 CMP Yeah.

00 02 42 15 LMP Okay, Ken - Ken, look - -

00 02 42 16 CMP I just can't.

00 02 42 17 LMP One - one quick one. You got to look at that Moon.

00 02 42 18 CDR No, no. Take the picture - take the picture.

00 02 42 21 LMP Ohh.

00 02 42 22 CMP Come on, you guys. Look at that pretty star underneath us.

00 02 42 25 CDR Shut up and let's move.

00 02 42 26 CMP Okay. Hang on a second. Let me get through this - let me get my clothes here.

00 02 42 29 LMP Give - give us the camera.

00 02 42 30 CMP Yeah.

00 02 42 31 LMP Okay, I got - -

00 02 42 32 CMP ... get the camera for you.

00 02 42 36 CDR Okay, I'm gonna switch comm, too. Okay, Ken?

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Day 1

00 02 42 39 CMP Yeah. Okay, turn your suit power off.

00 02 42 43 LMP (Laughter) Okay, what am I supposed to take a picture of, the Moon? It - Oh. Okay, let me take the dark slide out. Okay, I got about f/8; I put - I ought to put it on f/11, huh? I hope they don't expect me to look at the Flight Plan right now.

00 02 43 31 LMP Transfer state vector. Did we do the VERB 66? Okay, the Moon is out of window number 2 - CMC 2 - 250 - CEX. Okay, that's a 250-millimeter lens you got - you want there. We don't want that. We want a Earth picture.

00 02 43 56 LMP f/8? I'll try one at f/8.

00 02 43 59 CDR Oh - you got your - you plugged in?

00 02 44 00 CC Apollo 16, Houston through Hawaii. Over.

00 02 44 07 LMP Roger.

00 02 44 08 CMP ...

00 02 44 09 LMP We're reading you 5 by through Hawaii - -

00 02 44 10 CDR What, Ken? What?

00 02 44 11 LMP - - Gordy, and they're shifting couches.

00 02 44 12 CMP I didn't get any waste stowage vent valve closed.

00 02 44 15 CDR Okay.

00 02 44 16 LMP I got all those circuit breakers.

00 02 44 18 CDR You got the high gain antenna?

00 02 44 19 LMP Yeah.

00 02 44 20 CDR And the FLIGHT BUS?

00 02 44 21 LMP Sure.

00 02 44 24 CDR WASTE STOWAGE VENT, CLOSED. It's going to CLOSED, old buddy.

00 02 44 28 CMP Okay.

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00 02 44 30 LMP Look at the way the stars show up in the daytime.

00 02 44 33 CDR Yeah, yeah.

00 02 44 35 LMP Houston, this is the most spectacular view in the - you can possibly imagine.

00 02 44 40 CDR What did you do with the camera?

00 02 44 42 LMP I got it right here.

00 02 44 44 CMP Okay, you got the - -

00 02 44 45 CC Apollo 16, Houston through Hawaii. Over.

00 02 44 46 CDR Got the what?

00 02 44 48 LMP Roger, Gordy. You're 5 by and it's - -

00 02 44 50 CMP I'm turning DIRECT O<sub>2</sub> on.

00 02 44 51 LMP - - the most spectacular view I've ever seen.

## TIME SKIP

00 03 02 54 CMP Okay, Houston. We're getting ready to arm the pyros. Are you ready?

00 03 03 03 CC Roger. We're ready.

00 03 03 04 CMP Okay. PYRO ARM. A is armed and B is armed.

00 03 03 09 LMP Okay. GDC ALIGN.

00 03 03 11 CMP That's - done.

00 03 03 13 LMP Okay. EMS FUNCTION, DELTA-V.

00 03 03 15 CC ... good.

00 03 03 17 CMP Okay.

00 03 03 18 LMP Okay, let's read it - you want me to read out the - the rest of it?

00 03 03 20 CDR Okay. Go ahead.

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00 03 03 21 CMP Let's see, I want to get a VERB 62 in here. Is that - that should be about where we start the time, right?

00 03 03 24 CDR Yeah.

00 03 03 25 LMP Yeah. We're right at where we start the DET.

00 03 03 29 CMP Okay, now, what we're gonna do - is we're gonna start the clock, and I'll call times. At 50, I'll take the CMC MODE switch to AUTO; at 58, I start hitting the plus-X. And then at 0, I push this button.

00 03 03 49 CDR Okay.

00 03 03 50 CMP We ullage for 3 seconds, and I release it.

00 03 03 52 CDR Okay.

00 03 03 54 CMP I'll take my ACCEL COMMAND; pitch up - in 10 seconds, I'll pitch up, making sure this needle's positive.

00 03 03 59 CDR Okay.

00 03 04 02 CMP When it goes positive, you can go to - -

00 03 04 03 CDR PRO - -

00 03 04 04 CMP - - V18.

00 03 04 05 CDR Okay.

00 03 04 06 CMP And - and - Yeah.

00 03 04 07 CDR PRO when you pitch.

00 03 04 08 CMP Yeah. And it's a VERB 61.

00 03 04 09 CDR Okay.

00 03 04 10 CMP Okay?

00 03 04 12 CDR Yeah.

00 03 04 14 CMP Shall we?

00 03 04 15 CDR Yeah.

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00 03 04 16 CMP Okay.

00 03 04 17 LMP Okay.

00 03 04 18 CDR ...?

00 03 04 19 LMP Okay. Yeah. EMS MODE to NORMAL.

00 03 04 20 CMP Okay, I'm going to catch that at the last minute because it counts.

00 03 04 22 LMP Okay.

00 03 04 24 CMP You know, John, if you'll just notice what it is for me - -

00 03 04 25 CDR Okay.

00 03 04 26 CMP - - so we have some measure. Okay? Ready to start the clock?

00 03 04 28 LMP Yeah. I want to get my countdown on time.

00 03 04 36 CMP Okay, we're coming up on 59:40 -

00 03 04 39 CMP MARK. Okay, I'm going to hit NORMAL on the EMS. Eight - AUTO.

00 03 04 54 CMP This is the right one?

00 03 04 57 CDR Yeah.

00 03 04 58 CMP 1, 2 - Bang!

00 03 05 00 LMP There we go - -

00 03 05 01 CMP 1, 2, 3, release. It's off. Oh, boy. We're holding attitude pretty good. Pitch is - pitch up. Okay, PRO - John.

00 03 05 15 CDR PRO -

00 03 05 16 CMP Okay - -

00 03 05 17 LMP PRO's in; talkbacks are all gray.

00 03 05 18 CMP Good.

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00 03 05 19 CDR All the talkbacks are gray.

00 03 05 20 CMP Okay.

00 03 05 21 LMP Okay. The REACTANT valve is going to ...

00 03 05 22 CMP All right.

00 03 05 23 LMP Okay, close the SECs - -

00 03 05 24 CDR Okay, all the talkbacks are still gray, Houston. It's pitching around now.

00 03 05 26 LMP Okay, hit these four to CLOSE.

00 03 05 28 CC Roger, John.

00 03 05 31 LMP Okay, and I got a gray on - -

00 03 05 33 CMP Man, look at all the junk out there.

00 03 05 34 CDR Let me look out here and see what that stuff looks like. ...

00 03 05 46 CDR There go the doors.

00 03 05 49 LMP Can you see one?

00 03 05 50 CDR Yeah.

00 03 05 51 LMP Oh, I see one.

00 03 05 52 CMP Okay, let's look for that booster. That's the guy I don't want to hit. Watch my - watch my hand controller, John.

00 03 06 05 CDR There's a door out there by the Earth (cough).

00 03 06 10 LMP Okay. Did you get DIRECT ULLAGE, two, open?

00 03 06 12 CMP DIRECT ULLAGE.

00 03 06 13 CDR There he is. He's right out there.

00 03 06 14 CMP Okay. We're clear?

00 03 06 15 CDR Yeah.

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00 03 06 16 LMP Okay.

00 03 06 17 CDR You're well clear, and you're about 60 feet out.

00 03 06 19 LMP Okay. Load the DAP.

00 03 06 20 CMP Not yet, we got to get ... - -

00 03 06 21 LMP Oh, okay. That's right. We got to go there.

00 03 06 24 CMP Okay. Man, did you ever see so much junk?

00 03 06 30 CDR No.

00 03 06 31 CMP Oh, look at that. It's like a picture.

00 03 06 32 CDR Yeah.

00 03 06 33 CMP Okay.

00 03 06 34 CDR Load the DAP.

00 03 06 35 CMP Wait, wait, wait - I'm not clear yet.

00 03 06 38 CDR Okay.

00 03 06 39 CMP Yeah, let me get my ullage in here before you - before you change the DAP on me.

00 03 06 44 CDR Okay. Is it going to stop by itself?

00 03 06 46 CMP Yes, sir.

00 03 06 49 CDR You want KEY RELEASE?

00 03 06 51 CMP Yeah.

00 03 06 53 CDR Ahhh. That maneuver put us -

00 03 06 56 CMP Okay; here goes. 1, 1, 2, 3, 4.

00 03 07 02 CDR That's 4 ...

00 03 07 03 CMP Okay. Now you can change it.

00 03 07 05 CDR KEY RELEASE. VERB - VERB what? VERB 48 - -

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Day 1

00 03 07 07 CMP ENTER, no, you got to ENTER first. John, let's go back to your RELEASE - KEY RELEASE - KEY RELEASE. There you go.

00 03 07 16 CDR VERB 40 what?

00 03 07 17 CMP VERB 48 ENTER.

00 03 07 19 CDR ... lll -

00 03 07 22 CMP lll02. Hey, how you doing with that TV?

00 03 07 25 LMP Coming up on the - getting the - ANTENNA's going to REACQ right now.

00 03 07 32 CDR Looks like it's about 80 feet out.

00 03 07 35 CMP Looks like it's still open.

00 03 07 36 LMP Okay, Houston; you got the high gain?

00 03 07 38 CDR Well, I think you're closing, but I sure can't tell it - -

00 03 07 40 CC Roger, Charlie.

00 03 07 41 LMP You got the DAC started?

00 03 07 42 CDR - - ...

00 03 07 43 CMP Oh, I forgot! Ten feet, f/8, 12.

00 03 07 46 LMP Okay.

00 03 07 50 CMP ... turn the power on and I think I'm gonna hold it off for a second here ...

00 03 07 56 LMP Yeah.

00 03 07 57 CMP ... close ...

00 03 08 05 LMP Okay, did you get the DAP?

00 03 08 06 CDR The DAP is set.

00 03 08 12 CMP Man, that looks like I'm opening, doesn't it, John?

**CONFIDENTIAL**

Day 1

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Page 103

00 03 08 19 CDR Yeah. ... you ... Whatever you ... it ... much to open it.

00 03 08 23 CMP I don't want to put in too much ... rate.

00 03 08 25 CDR That's right. ...

00 03 08 28 CMP Hey, when that thing turned around, guys, the crosshairs in the COAS are within the docking target.

00 03 08 37 LMP Well, I can't get - I - I got this half of a picture - -

00 03 08 39 CDR It is close - closing, isn't it?

00 03 08 44 CMP Yeah, he is.

00 03 08 45 LMP Okay, Houston, you ought to be getting some TV.

00 03 08 47 CMP I'm trying to get a mark on that.

00 03 08 51 CC I haven't got it yet; we're working on it.

00 03 08 54 CMP Have you - how does the monitor look?

00 03 08 56 LMP It looks great; but all I got is just this little picture - the cor - the corner of the picture. I can't - -

00 03 08 59 CMP Well, if you move the - -

00 03 09 01 CDR You got to move the camera.

00 03 09 02 CMP - - camera?

00 03 09 03 LMP That's what I've been trying to do, and I can't get any more -

00 03 09 05 CMP ... That thing is maneuvering in attitude a little bit. I don't think I'm closing ...

00 03 09 13 CDR ...

00 03 09 14 CMP Let it ride?

00 03 09 15 CDR ...

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00 03 09 19 LMP Hmph, there we are - perfect picture.

00 03 09 30 CDR I don't think you're closing.

00 03 09 35 CMP Give me -

00 03 09 36 CDR ...

00 03 09 37 CMP Give me - -

## TIME SKIP

00 03 17 18 CDR ... on?

00 03 17 20 CMP Well, I'm going back over them, and I can't see -  
Well, I don't know.

00 03 17 38 CMP I tell you, it doesn't dress up very much - or even.

00 03 17 43 CDR ... should be ...

00 03 17 49 LMP Looks like something in the ... or something.

00 03 17 52 CDR ..., Charlie.

00 03 18 00 CMP Man, this patience biz is hard to take (laughter).  
We're dressing up in pitch now, John, and the yaw  
is, too. We're gonna have lots of time here.

00 03 18 15 CDR Ken's taking some time in dressing this thing up  
to get these attitudes right.

00 03 18 22 CMP Seems to be ... - -

00 03 18 23 CC ...

00 03 18 24 CMP - - ... quite a bit from the attitude that we had.

00 03 18 43 LMP Look at that. Isn't that something else?

00 03 18 46 CDR Yeah.

00 03 18 57 CMP ... fired it again, it looked like ...

00 03 19 15 CMP My docking budget didn't allow for all this. But  
I get no prize if I break it.

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00 03 19 42 CDR ...

00 03 19 44 LMP Looks like Mylar.

00 03 19 45 CDR Yeah, I think it's probably Mylar. I think we got some gas ... trapped in those blankets maybe.

00 03 19 51 CMP John, is it worth dressing up the roll, do you think?

00 03 19 54 CDR I don't think so. It looks like that's ...

00 03 19 57 LMP Yeah, it looks ... in.

00 03 19 58 CMP Okay; we're about - I'm trying to guess what it is in degrees we're off. I guess we're still off maybe 3 or 4 degrees.

00 03 20 05 CDR Ain't supposed to be off that far.

00 03 20 08 CMP I'll go on over ... - -

00 03 20 09 CDR ... what the book says.

00 03 20 10 LMP ... 9?

00 03 20 11 CDR Yeah.

00 03 20 12 CMP Well, you know they don't tell you how to tell the degrees you're off. I - I guess I never worried about it except ...

00 03 20 19 LMP ... pitch and yaw ... degrees.

00 03 20 22 CDR Yeah. ... .. degrees.

00 03 20 33 CDR Coming back.

00 03 20 34 CMP Yeah.

00 03 20 35 CDR ... get it back ...

00 03 20 37 CMP Yeah. Okay; all we have to do in order to do it now is what?

00 03 20 42 LMP Put DOCKING PROBE, RETRACT, to PRIM 1. That's all you got to do.

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00 03 20 46 CMP Okay.

00 03 20 47 CDR Say when.

00 03 20 49 CMP Yeah, ... get the camera started.

00 03 20 51 CDR Early?

00 03 21 05 CMP We got both rates nulling at the same time.

00 03 21 08 CDR Okay.

00 03 21 22 CMP Little more help here in pitch. ...

00 03 21 29 CDR Okay, you guys.

00 03 21 31 CMP Okay, Charlie.

00 03 21 32 CDR ... pitch?

00 03 21 34 CMP I tell you what. We're within a width of a line.

00 03 21 36 CDR That's good.

00 03 21 37 LMP That's good.

00 03 21 38 CDR Okay.

00 03 21 39 CMP I'm ready.

00 03 21 40 LMP Okay.

00 03 21 41 CDR Okay.

00 03 21 42 LMP PRIM 1. Here it comes.

00 03 21 55 LMP Man, I think that was it.

00 03 21 57 CDR ... it goes FREE ... AUTO.

00 03 21 59 CMP I am FREE.

00 03 22 00 LMP Okay. Did you get a - -

00 03 22 01 CDR Okay, Houston. We're hard docked.

00 03 22 03 LMP Did you get a - a gray?

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00 03 22 04 CC ...., John. We saw it come in.

00 03 22 08 LMP Did you get grays?

00 03 22 09 CMP And there is no question when you get the latches.

00 03 22 11 CDR Yeah.

00 03 22 12 LMP SECS PYRO ARM, two, SAFE?

00 03 22 13 CC ...., Ken.

00 03 22 15 CMP PYRO ARMs 1 and 2, SAFE.

00 03 22 16 LMP SECS LOGIC, two, OFF?

00 03 22 18 CMP LOGIC, two, OFF.

00 03 22 19 LMP EDS POWER, OFF.

00 03 22 21 CMP EDS POWER, OFF.

00 03 22 23 LMP CB EDS, three, open?

00 03 22 25 CMP EDS 1, 2, 3, open.

00 03 22 28 CC John, this is Houston.

00 03 22 31 CDR Go ahead. Over.

00 03 22 32 CC We'd like - we noticed the mixing valves cycling about once every 10 or 15 seconds. We'd like to give you a mark at which time we want you to put the GLYCOL EVAP TEMP IN valve in MANUAL and try to catch the flow rate at the appropriate setting. I'll - I'll give you kind of a countdown and a mark here.

00 03 22 54 CMP I think we saw it before.

00 03 22 55 CDR Yeah, we've been noticing that ourselves.

00 03 22 56 CMP Okay, Charlie. Let me - let me give you some numbers here before I get off. With it - When we were docked - -

00 03 23 01 CC The flow rate's high and starting back down.

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00 03 23 07 CDR Go ahead and catch it.

00 03 23 08 CMP Okay.

00 03 23 26 CC John, now all of a sudden we've stopped seeing it - that it has stopped cycling. You didn't throw the switch already, did you?

00 03 23 34 CDR That's negative. We're awaiting your mark there.

00 03 23 38 CMP Okay; that's DOCKING PROBE EXTEND/RELEASE ... - -

00 03 23 39 CC ... (chuckle) It just hung up, just as soon as I said that. Stand by.

00 03 23 41 CMP - - ... supposed to do that. Let me pull those docking probe circuit breakers.

00 03 23 46 CDR Yeah, that's ...

00 03 23 47 CMP So there's no danger.

00 03 23 48 LMP Okay.

00 03 23 49 CMP Okay, DOCKING PROBE MAIN A and MAIN B are open.

00 03 23 52 LMP Okay; DOCKING PROBE EXTEND/RELEASE, OFF.

00 03 23 55 CDR EXTEND/RELEASE, OFF.

00 03 23 56 LMP DOCKING PROBE RETRACT, two, OFF.

00 03 24 00 CDR Okay, ... - -

00 03 24 01 CMP Hey, when that thing's lined up, it's one bar width - the target is one bar - -

00 03 24 06 CC We'd like you to cycle the MANUAL back to AUTO and see if that starts it back down. Over.

00 03 24 11 CDR For gosh sake.

00 03 24 14 LMP Okay; you were in MANUAL for about 2 seconds, and back to AUTO.

00 03 24 20 CMP And the - it's over to the right one bar width and up one-half bar width.

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00 03 24 25 LMP Okay, we're ... - -

00 03 24 26 CC Okay, it's coming down now. Stand by to put it in MANUAL.

00 03 24 29 SC (Laughter)

00 03 24 30 CC Ready. Now.

00 03 24 33 LMP Okay, okay; you got it right now on the "now." Okay; say that again, Ken.

00 03 24 38 CMP Okay. My - the cross is one-half bar width - -

00 03 24 41 CC ... was a little slow on the "now," but leave it there for now and press on with the normal procedures.

00 03 24 46 SC (Laughter)

00 03 24 47 CMP - - and one bar to the right of the target. Right then - right here next to my docking ...

00 03 24 56 LMP Okay. EXTERIOR LIGHTS, OFF.

00 03 25 07 LMP Okay. TAPE RECORDER's off. Going off.

## TIME SKIP

00 03 54 42 LMP DAC 6 ... feet per second, 6 frames per second.

00 03 54 46 CMP DAC's - was 6 frames per second, and what did you say - 6 feet?

00 03 54 50 LMP No, just 6 frames per second. Okay, lo - DAP is - load the DAP, 21101.

00 03 55 04 LMP And - Okay, that's go. And load PITCH trim a plus -

00 03 55 09 CMP Okay, just ...

00 03 55 11 LMP Plus 123.

00 03 55 15 CMP ... 123.

00 03 55 19 LMP And YAW is minus 0.2.

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00 03 55 26 CMP Okay.

00 03 55 27 LMP Okay, load NOUN 22 attitude maneuver - monitor -  
Okay, it's a 90, 325 point - load NOUN 22. PRO on  
that one now.

00 03 55 35 CMP Okay.

00 03 55 40 LMP Nine - plus 90 - 09000, plus 325.5 - zero,  
plus 355.90. Okay; VERB 60 - VERB 63.

00 03 56 01 CDR ... set.

00 03 56 04 LMP GDC align; DET, RESET.

00 03 56 20 CMP It's RESET.

00 03 56 21 LMP CB SECS ARM, two, closed.

00 03 56 24 CMP That's affirmative. I got SECS ARM, two, close,  
verify.

00 03 56 27 LMP Okay; that's right. Cue MSFN.

00 03 56 32 CDR Okay, Houston. We're ready to proceed with the  
logic.

00 03 56 38 CC Okay. Stand by.

00 03 56 40 LMP SECS LOGIC, two, on, up.

00 03 56 45 CMP There's two LOGICs on.

00 03 56 47 LMP Want me to hold the Flight Plan, Ken?

00 03 56 50 CC ... GO for pyro arm.

00 03 56 54 CMP Okay. All right, now. Yeah. Before we get ready  
to get off - -

00 03 56 59 CDR Roger, Houston.

00 03 57 00 CMP - - there's a couple of items we need to review, so -

00 03 57 02 CDR Go ahead.

00 03 57 04 LMP Okay; why don't we go down to that part?

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00 03 57 05 CMP Yeah.

00 03 57 06 LMP Okay. Have you armed the pyros?

00 03 57 08 CMP No, sir. Arm them.

00 03 57 10 LMP Yeah.

00 03 57 12 CDR Here comes PYRO A -

00 03 57 13 CDR MARK. PYRO B -

00 03 57 15 CDR MARK.

00 03 57 16 LMP TVC SERVO POWER, on - POWER number 1.

00 03 57 18 CDR TVC SERVO POWER, number 1, is AC1/MAIN A.

00 03 57 21 LMP TRANS CONTROL POWER, on, up; verify.

00 03 57 23 CDR TRANS CONTROL POWER's on.

00 03 57 24 LMP RHC - -

00 03 57 25 CC Okay, they look good.

00 03 57 27 LMP Okay, RHC and THC armed?

00 03 57 30 CMP They're armed.

00 03 57 31 LMP Okay, then call P47. Okay, what do you want to do?

00 03 57 35 CMP Let - let's review before we get into 47.

00 03 57 36 LMP Okay.

00 03 57 37 CMP Okay. The - the thing we got to do when we get through here is I want to be sure that there's a - we're gonna come in the last thing we started and we said at the time we hit SEP, I start my clock, and - and then at - -

00 03 57 53 LMP To AUTO?

00 03 57 54 CMP - - 3 - 5 seconds, I thrust for 3.

00 03 57 55 CDR Okay.

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00 03 57 56 CMP Okay?

00 03 57 57 LMP And you go to AUTO, - you go to - start your clock and go to AUTO.

00 03 57 59 CMP And go to AUTO. At the same time, John hits the SEP.

00 03 58 02 LMP Okay.

00 03 58 03 CMP Right?

00 03 58 04 CDR And we'll ... all three of the ... on the line again.

00 03 58 06 CMP Okay, and I'm going to hold my hand here. Okay; now the next thing is that I want to do this maneuver - is within 30 - at - any time after 30 seconds, I can start my maneuver.

00 03 58 16 CDR You got to get clear?

00 03 58 17 CMP Yeah, 30 seconds and clear. We'll go ... approximately a minute. Okay. They haven't clued us to get off. I guess that's all we're waiting on. Are there any questions?

00 03 58 27 LMP Houston, we got - we're ready to get off, if you guys are ready.

00 03 58 33 CC Okay. You're GO for ejection.

00 03 58 34 LMP Okay. P47.

00 03 58 44 LMP EMS MODE to NORMAL.

00 03 58 46 CMP ... this display up here? Okay, at 5, I go for 3.

00 03 58 55 CDR All righty.

00 03 58 56 LMP Okay. EMS MODE to NORMAL.

00 03 58 57 CDR It's NORMAL.

00 03 58 58 LMP Start the DAC.

00 03 58 59 CDR DAC is started.

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00 03 59 05 CMP Okay. Are you all set? I'll give you a countdown. We'll go at zero. 5, 4, 3, 2, 1 -

00 03 59 14 CMP MARK.

00 03 59 15 LMP Man, there we go, man. Okay; we're off, Houston.

00 03 59 25 CDR ... 2, 3, 4 ... Okay, now, in a minute, we're gonna - -

00 03 59 27 CMP I guess it's gone; I can't see it anymore.

00 03 59 29 LMP Well, we're not quite - -

00 03 59 30 CDR COMPUTER ACTIVITY light out, right?

00 03 59 39 CDR Okay, and ... Okay and go to ... there.

00 03 59 44 LMP VERB 49.

00 03 59 45 CMP Oh, oh, don't - Yeah, okay. Let's go to a minute. Can you see the booster anywhere in sight?

00 03 59 51 LMP No, it's gone.

00 03 59 52 CMP Think so?

00 03 59 53 LMP Yeah.

00 03 59 54 CMP Okay, I got my BMAGs caged. All off.

00 03 59 57 LMP Okay. ... - -

00 03 59 59 CMP All righty. I'm ready.

00 04 00 00 LMP Okay.

00 04 00 01 CMP ENTER. PRO. Is that the right attitude?

00 04 00 05 LMP Yeah.

00 04 00 06 CMP Okay.

00 04 00 07 LMP Confirm that.

00 04 00 08 CMP All righty. Go.

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00 04 00 09 LMP Okay. SECS PYRO ARM, two, SAFE.

00 04 00 10 CMP Okay, looks good.

00 04 00 14 LMP ... CMC ... maneuver?

00 04 00 18 CDR Yeah.

00 04 00 19 LMP Yeah.

00 04 00 20 CMP Okay.

00 04 00 21 LMP Do you have your pyro - -

00 04 00 22 CMP Your PYRO ARMs are two going to SAFE.

00 04 00 23 LMP Okay, SECS LOGIC, two, OFF.

00 04 00 24 CMP SECS LOGIC, two, OFF.

00 04 00 26 LMP CB, SECS ARM, two, open.

00 04 00 29 CMP SECS ARM, 1, 2, open. There's another strap.

00 04 00 34 LMP S-IVB/LM SEP - Okay, I'll ...

00 04 00 42 CDR Okay, LM SEP, two, open.

00 04 00 44 LMP I got them. Okay. The O<sub>2</sub> TANK ISOL valve is gray.

00 04 00 48 CDR Okay. It says O<sub>2</sub> TANK 3 ISOL valve talkback gray.

00 04 00 49 CMP Hey, what - did - didn't we -

00 04 00 55 CDR MAPPING CAMERA ON switch is supposed to go to OFF.

00 04 00 57 CMP 21101. And it doesn't look like we're yawing enough. Oh, I know what it is.

00 04 01 06 LMP MAPPING CAMERA, ON, to OFF.

00 04 01 09 CDR ...

00 04 01 12 CMP We - we left it in the - No, you put a 63 in there. But, boy, that's ...

00 04 01 18 CDR All right.

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00 04 01 20 LMP What do we do?

00 04 01 21 CDR MAPPING CAMERA ON should be OFF.

00 04 01 23 LMP I got it. PAN CAMERA - -

00 04 01 24 CDR PAN CAMERA POWER should be OFF. SERVICE MODULE/AC POWER should be OFF.

00 04 01 29 LMP Well, I can't ...

00 04 01 30 CDR I can get that one.

00 04 01 34 CMP Okay, Houston. We're doing our maneuver, and we'll tell you as soon as we have a visual.

00 04 01 40 LMP Which way should it come out of?

00 04 01 42 CMP Well, that's why I got this ... - -

00 04 01 43 CC ...

00 04 01 44 CMP - - ball set here. We have to get rid of that thing.

00 04 01 47 CDR Yeah.

00 04 01 48 CMP It floated ... - -

00 04 01 49 LMP That's John's.

00 04 01 50 CMP - - ... pain in the neck.

00 04 01 51 CDR Sorry.

00 04 01 52 CMP Oh, here it is.

00 04 01 53 CDR It is a pain.

00 04 01 54 CMP Okay; we have rolled right 20 degrees.

00 04 02 01 LMP Man, we fired some jets, I'll tell you.

00 04 02 03 CDR ...?

00 04 02 04 LMP Yeah, you can see those Mylar particles getting blown off of the ...

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00 04 02 08 CMP Rolling to 90 - Oh, you can feel this thing kind of - -

00 04 02 11 CDR SERVICE MODULE/AC POWER to OFF.

## TIME SKIP

00 08 00 58 CMP - - here now?

00 08 00 59 CDR Supposed to. Trying to get it in the ...

00 08 01 04 CMP I'll get the second one up. How about a - an antenna angle of minus 85 and YAW 153. Minus 85 - -

00 08 01 19 LMP Okay.

00 08 01 20 CMP YAW 153. Is it ...?

00 08 01 26 LMP No. We got comm.

00 08 01 28 CMP Oh! I bet that's what I heard.

00 08 01 44 CMP (Sigh) Well, I can see I was wrong.

00 08 01 51 LMP In what?

00 08 01 53 CMP The only guys that don't understand space flight are not the flight planners (laughter).

00 08 01 59 CDR Yeah. The food people.

00 08 02 01 LMP I'll say.

00 08 02 02 CMP (Laughter) They is other folks in that operation that don't understand. Well, let's see. I guess you got to cut this thing first.

00 08 02 15 CDR Yeah.

00 08 02 16 CMP Scissors, John?

00 08 02 17 CDR Yeah. I got them.

00 08 02 21 CMP The old head full again?

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00 08 02 23 CDR Yeah. Really smarts. You want me to unloosen this down here? Put it right up here.

00 08 02 40 LMP Okay. I've got one of those bags back here that you can ... orange juice in.

00 08 02 54 CMP Put that in the trash?

00 08 03 02 CDR The trash bag's done untied itself.

00 08 03 04 CMP Yeah, I ain't sure that's going to be an acceptable solution. I'm afraid I - Maybe we ought to use one of those TSBs after all. Let's try that.

00 08 03 18 CDR Avoid that one.

00 08 03 25 CMP Oh, here come de Sun. Order in the courtroom; here come de Sun.

00 08 03 32 LMP What did you get, Ken?

00 08 03 33 CMP I got one. Okay, I didn't realize you had one that was empty. Excuse me.

00 08 03 39 LMP ...

00 08 03 53 CMP That is obviously not one of the bags for me to fill up and use for my other water stuff.

00 08 04 12 CMP Thank you, sir.

00 08 04 19 CDR Guess we ought to tape the things. I don't know. Tape up the bags because if we throw them down in there loose, pretty soon we'll have so much stuff down in there we won't know what to do with them. What do you think?

00 08 04 32 CMP Yeah. We ought to be able to make some kind of a lid to go over it. Tape a lid down or something? Don't you think?

00 08 04 40 CDR Sock me a pill. Is there any left?

00 08 04 42 LMP Yeah. Here's one right here.

00 08 04 56 LMP Here you go.

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Day 1

00 08 04 57 CDR Okay. What do you have to do? Take it loose, or just -

00 08 05 02 LMP Yeah. I guess. Take the paper off that thing?

00 08 05 08 CMP No, no. No. Just stick it in the way it is.

00 08 05 10 LMP Oh, really?

00 08 05 11 CMP Yeah.

00 08 05 12 LMP Hmm; I took the paper off.

00 08 05 13 CMP No, you don't need to. You pull it out - just pull the thing out and stuff it in there and it'll be fine.

00 08 05 17 CDR It's not edible paper, huh?

00 08 05 21 LMP I'm thinking about sticking a window shade in over here.

00 08 05 25 CMP Yeah, you ought to have a little Sun. Well, it's really - ought to end up in here.

00 08 05 28 LMP What?

00 08 05 29 CMP Yeah.

00 08 05 30 LMP The Sun?

00 08 05 31 CMP Yeah. If you want to put that window shade in, it wouldn't be a - it would be an appropriate thing, I bet. Looks like we're about ready to - Well, we're on OMNI B now. ... maybe the high gain would pick up. Well, it's fluctuating back and forth.

00 08 06 06 CDR Just leave those bags out until we get a whole mess of them, and then we'll put them all in the cupboard and stuff them in there.

00 08 06 12 LMP Yeah.

00 08 06 32 CMP That is going to be a bright bear out there, isn't it?

00 08 06 34 LMP Yeah.

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00 08 06 35 CDR Yeah. ... What are we doing?

00 08 06 38 CMP We're getting ready to go - do a P23. I - You trying to close it or open it?

00 08 06 42 LMP I was trying to close it.

00 08 06 43 CMP Okay.

00 08 06 44 LMP Go ahead.

00 08 06 45 CMP I'll get it. Boy, that comm is less than optimum.

00 08 07 25 CMP Okay, now. Looks like I'd better heat up that evaporator, huh?

00 08 07 31 LMP That's falling off a little bit. See?

00 08 07 33 CMP Okay. I hate to - ... if I put some Velcro on it - a little bit.

00 08 07 55 CDR Okay, Ken. You want to get down here and P23 your way through this thing?

00 08 07 59 CMP Yes, sir. I'll be down there in just a second.

00 08 08 05 CDR Being a big manual guy, huh?

00 08 08 08 CMP Huh?

00 08 08 09 CDR Being a big manual person?

00 08 08 17 CMP Okay, here's two ... You're gonna have to screw in this thing, it looks like. It's really bad that we have to play with that thing. Can you - did we stop it in the attitude?

00 08 08 31 LMP Yeah, we're here.

00 08 08 32 CMP Okay. Do you think we're gonna - you gonna be able to work on that food business while I'm down here?

00 08 08 42 CDR Yeah, maybe. I don't know.

00 08 08 46 CMP I can probably work on this thing by myself, if I - Darned umbilicals.

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Day 1

00 08 08 53 LMP Hey, Ken, could you put that in the jettison bag?

00 08 08 55 CMP Yes, sir, ...

00 08 08 56 LMP When you get a chance?

00 08 08 57 CMP What is it?

00 08 08 58 LMP It's all those screws and -

00 08 09 00 CMP Oh, yeah. I was gonna - you got to wrap up this tape hanging down.

00 08 09 09 LMP Well, you need - Here's two more that came off.

00 08 09 10 CMP Oh, wait - wait a minute. I'll get some tape to hold it together.

00 08 09 29 CDR You've got - What? Is yours off over there, too, Charlie?

00 08 09 33 LMP What's off?

00 08 09 34 CDR Oh, just - is it just over here underneath the docking ring that it's off?

00 08 09 38 LMP Yeah. Well, I can see the edge of that panel over here and over there.

00 08 10 27 CDR Yeah, it looks like some more of that gray stuff come off of it.

00 08 10 48 CMP Okay, John. I'm gonna see what I can do here. Let me see if I can find me a G&C Checklist, P23.

00 08 11 23 CMP By golly, it's right there. Some things we do pretty well, I guess. This program has figured out how to find stars.

00 08 11 39 CDR Well, I'll tell you something, you guys. There may be a star out there, but I sure don't see it.

00 08 11 45 CMP Even in the sextant?

00 08 11 46 CDR Oh, yeah, it's right in the middle of the sextant.

00 08 11 47 CMP What'd you get for ... - -

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00 08 11 48 CDR It's ...

00 08 11 49 LMP ...

00 08 11 50 CDR Sure ain't in the telescope, Ken.

00 08 11 51 LMP Oh - -

00 08 11 52 CDR It's right in the sextant - -

00 08 11 53 LMP Oh, yeah; and it's fantastic.

00 08 11 54 CMP But there's - -

00 08 11 55 LMP Oh, it's just great.

00 08 11 57 CMP But there's just - that telescope is just useless unless you want to look at the quad or the radar.

00 08 12 01 CDR Yeah, but what star is it?

00 08 12 02 CMP It's 40.

00 08 12 15 CDR Do you see anything leaking out over there, Charlie? Any particles coming off the LM?

00 08 12 20 LMP No.

00 08 12 21 CDR Huh?

00 08 12 22 LMP No.

00 08 12 23 CDR You see any particles coming off?

00 08 12 24 LMP There are a few out there.

00 08 12 27 CDR ...

00 08 12 29 LMP See, you can't see -

00 08 12 49 CDR Yeah.

00 08 12 58 CDR Whatever it is, it's up in the -

00 08 13 14 LMP It looks like if it had been a leak - in a propellant tank, it would have - it would have - blown up. Blown the whole thing out of there instead of shredded it.

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00 08 13 36 CDR Okay.

00 08 13 44 LMP Well, whatever it was was coming out of there with full force, so it must have had some pressure behind it.

00 08 13 50 CDR It's still coming out of there?

00 08 13 56 LMP Do you see little particles?

00 08 13 58 CDR Yeah.

00 08 14 02 LMP Does that look like particles to you, vapor - vapor or just a -

00 08 14 06 CDR Yeah.

00 08 14 10 LMP Is that what vapor particles look like?

00 08 14 11 CDR Yeah, I think.

00 08 14 13 LMP Okay. Here goes.

00 08 14 18 CDR Houston, 16. Over.

00 08 14 30 CDR They reading us?

00 08 14 36 CDR Houston, 16. Over.

00 08 14 44 LMP We've got a pretty low signal here. Let me go to the high gain. Okay. You got - put it in REACQ. There you go.

00 08 14 57 CDR Got them?

00 08 14 58 LMP Yeah. With good signal strength.

00 08 15 00 CDR Houston, this is 16. Over.

00 08 15 02 CC ... 16. You're loud and ...

00 08 15 05 CDR Roger. I see something coming off the lunar module now that I - I haven't been up here looking out the window. I just noticed it's a - it's a - it looks like it is coming out of a vent or something.  
It's - -

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## DAY 2

01 00 53 25 CMP Okay. I'll read these out as I go through them. And the only thing that looked a little different is when I got down to the step where it said PAN CAMERA MODE to STANDBY, it already was. I guess that's just an oversight. John, would you switch - why don't you put me on VOX?

01 00 53 50 CDR You want to be on VOX?

01 00 53 51 CMP Yeah. No, that's top switch, top left, all the way down.

01 00 54 03 CMP John? John?

01 00 54 05 CDR What?

01 00 54 06 CMP What's the thumbwheel setting?

01 00 54 11 CDR It's - too low. It's 5.

01 00 54 16 CMP I - Okay, Tony. Can you read me now? I'm on VOX.

01 00 54 19 CC Stand by.

01 00 54 22 CMP All righty. MAPPING CAMERA is coming ON. Stand by -

01 00 54 29 CMP MARK.

01 00 54 42 CMP You like to have the PAN CAMERA SELF TEST simultaneously, or would you like to do it sequentially?

01 00 54 48 CDR Yeah. Huh?

01 00 54 52 CMP Okay. PAN CAMERA to SELF TEST. Getting SELF TEST -

01 00 54 55 CMP MARK. Barber pole now.

01 00 55 01 CDR It's on, Charlie.

01 00 55 13 CDR Hope so. I wouldn't be talking to anybody if it wasn't on.

01 00 55 47 CDR Ken, you what to try the - -

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01 00 55 48 CMP Okay. Got the gray flag on the PAN CAMERA MODE talkback, and that took about 45 seconds as opposed to a minute.

01 00 55 58 LMP We'll get it ...

01 00 56 00 CC Okay. We copy that.

01 00 56 01 CMP Okay. So I'm gonna go ahead and take the PAN CAMERA POWER to OFF.

01 00 56 09 CC Okay.

01 00 56 17 CDR If you're gonna oxidize your DELTA-Ps, you're in - That's really a pain. How you gonna monitor something with that kind of an attitude?

01 00 56 26 CMP Okay. I'm getting ready to take the MAPPING CAMERA to OFF, center -

01 00 56 31 CMP MARK.

01 00 56 32 CC Okay. I've got 2 minutes here.

01 00 56 35 CMP You got a good watch.

01 00 57 01 CMP Okay, there's our 30 seconds.

01 00 57 06 CC Okay.

01 00 57 08 CMP Take the SM/AC POWER OFF. Man, that's what you call good timing.

01 00 57 21 LMP Okay, Tony. We're going OMNI Bravo and selecting - turning the high gain.

01 00 57 27 CMP S-BAND AUX TV to OFF.

01 00 57 29 LMP Okay.

01 00 57 31 CDR Gonna go OFF?

01 00 57 32 CC Okay. Sounds good, Charlie.

01 00 57 33 CMP Yes, please, John. Back to PTT, INTERCOM. Thank you.

**CONFIDENTIAL**

Day 2

~~CONFIDENTIAL~~

Page 125

01 00 57 37 CDR Back there?  
01 00 57 38 CMP PCM BIT RATE, LOW.  
01 00 57 40 CDR Got it.  
01 00 57 42 CMP We is done.  
01 00 57 44 CDR That was our big thing for today, wasn't it?  
01 00 57 47 CMP No, we got a little - -

TIME SKIP

01 06 33 18 CDR ... HELIUM VALVES, two, AUTO.  
01 06 33 19 CMP HELIUM VALVES. You got two in AUTO, right?  
01 06 33 21 CDR Yeah.  
01 06 33 22 CMP What's the - what did the pressure go to?  
01 06 33 24 CDR ... have to go without that TVC SERVO POWER, AC1  
and AC - -  
01 06 33 26 CMP One and two is done.  
01 06 33 27 CDR Okay. Then RA - RHC number 2 to AC.  
01 06 33 29 CMP Number 2 to AC.  
01 06 33 30 CDR DIRECT, two, to OFF.  
01 06 33 31 CMP DIRECT, twos are OFF.  
01 06 33 32 CDR BMAG, three, to 1/2.  
01 06 33 33 CMP One, 2, 3, to 1/2.  
01 06 33 37 CDR You have SPACECRAFT CONTROL to SCS.  
01 06 33 39 CMP SCS.  
01 06 33 40 CDR RHC number 2 to armed.

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01 06 33 42 CMP Number 2's armed.

01 06 33 43 CDR PITCH 1 - 1 and YAW 1 to START.

01 06 33 46 CMP MAIN A? Here we go; one.

01 06 33 48 LMP It's START.

01 06 33 49 CMP Two.

01 06 33 50 LMP It's START.

01 06 33 51 CDR Okay. Verify trim control and set. Verify - -

01 06 33 53 LMP Okay, Houston. I'm looking at oxidizer pressure just about 210. We're going to leave the valves in AUTO.

01 06 34 01 CDR Okay.

01 06 34 03 CMP Minus 0.12. Okay.

01 06 34 07 CDR Verify MTVC.

01 06 34 09 CMP Pitch is good. Yaw is good.

01 06 34 11 CDR Okay, ... - -

01 06 34 12 CMP ... feel that baby this time. Okay, going to CMC.

01 06 34 15 CDR SPACECRAFT CONTROL to CMC. Yes.

01 06 34 16 CMP Goes back to zero.

01 06 34 17 CDR Yes.

01 06 34 18 CMP No MTVC.

01 06 34 19 CDR ... MTVC.

01 06 34 20 CMP Okay?

01 06 34 21 CDR THC is - -

01 06 34 22 CMP/CDR Going clockwise -

01 06 34 23 CMP MARK.

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01 06 34 24 CDR/CMP No MTVC.

01 06 34 25 CMP MAIN B, Charlie.

01 06 34 26 LMP Go ahead.

01 06 34 27 CMP Here goes one.

01 06 34 29 LMP And one.

01 06 34 31 CMP Two.

01 06 34 32 LMP And one.

01 06 34 33 CDR ... set GPI trim - -

01 06 34 34 CMP Hmmm.

01 06 34 35 CDR - - and verify the MTVC.

01 06 34 40 CMP Yeah.

01 06 34 41 CDR Here you go.

01 06 34 42 CMP Huh? Okay, they're set.

01 06 34 45 CDR Okay.

01 06 34 46 CMP MTVC is good in pitch, good in yaw. Back to neutral. They go back to zero, back in CMC. KEY RELEASE. PRO.

01 06 34 56 CDR PRO.

01 06 35 09 CMP Looks good to me.

01 06 35 10 CDR Okay; ENTER.

01 06 35 12 CMP All right. Want me to get - let me get the atti - We're still oscillating. Let me get that squared away before I go back to -

01 06 35 21 CDR Okay, let's ENTER on that, okay?

01 06 35 22 CMP Yeah, yeah, that's fine.

01 06 35 23 CDR ENTER.

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01 06 35 24 CMP But don't PRO yet. Okay, got that.

01 06 35 35 CDR Okay?

01 06 35 36 CMP Yes, sir. Go ahead. Minus 2.

01 06 35 40 CDR Really shakes the ...

01 06 35 42 CMP Sure does. Plus 2. Minus 2. Boy, did that thing pulse on zero. Trim. Looks good.

01 06 35 57 CDR Okay.

01 06 36 01 CMP Okay. SCALE is 5/1. Going to RATE, HIGH. Wait for 59. I got DELTA-V, 8.3. You're gonna need bank A.

01 06 36 18 CDR Yeah. ... - -

01 06 36 19 CMP I'll shut it off.

01 06 36 20 CDR All right.

01 06 36 21 CMP ... this way. Turn her off at 3 seconds, or if you holler.

01 06 36 28 CDR Okay.

01 06 36 29 CMP Okay. Did the pressure stop going up?

01 06 36 31 LMP Yeah. It stopped at about 209.

01 06 36 32 CMP Okay. But - but it stopped on its own. It wasn't because you let go.

01 06 36 35 LMP Yeah.

01 06 36 36 CMP Okay. That was all I wanted. All righty.

01 06 36 39 LMP Fuel side went up to about 175.

01 06 36 42 CMP Okay. Okay, ... what there was about that DELTA-P? We haven't made such an issue of the DLETA-P before.

01 06 36 56 LMP See that? We said fuel and OX greater than the DELTA-P - greater than 35, OX greater than fuel. That's what we got right now. Man, I thought I burned them all.

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01 06 37 07 CMP Okay. Coming up on - coming up on a minute. Still have no thrust light on. I have no translation control power on because we don't have any - don't have any ullage.

01 06 37 30 CDR Yep.

01 06 37 36 LMP Well, if you want to trim, you got plenty.

01 06 37 37 CDR Point 5 - -

01 06 37 38 CMP Yeah. I'll catch it afterwards.

01 06 37 40 CDR - - well, ... worry about the trim.

01 06 37 45 CMP We'll get this one right on time. See if their bias looks good. Oh.

01 06 37 57 CDR There's a minute - coming up.

01 06 38 02 CMP MARK it. The DELTA-V in NORMAL. The light is still out. I'm bringing on DELTA-V THRUST switch A. Stand by.

01 06 38 11 CMP MARK. THRUST A.

01 06 38 13 CDR ...

01 06 38 20 CMP Yeah. Nothing more to do but monitor and shut down an overburn.

01 06 38 28 CDR ... lights.

01 06 38 36 CMP ... flashing. Okay. That doggone EMS isn't even going anywhere.

01 06 38 42 CDR ... 16, 17 ...

01 06 38 59 CMP Okay.

01 06 39 01 LMP He's open.

01 06 39 02 CDR One.

01 06 39 03 CMP 1000.

01 06 39 04 CDR Two.

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01 06 39 05 LMP No.

01 06 39 06 CMP Beautiful.

01 06 39 07 CDR Isn't that pretty?

01 06 39 08 LMP 2.1.

01 06 39 10 CDR Have you seen the SPS THRUST light? (Laughter)  
Okay.

01 06 39 15 CMP I don't know, John. I really don't.

01 06 39 21 CDR Okay. Less than 0.2, plus 0.4. Well. The old  
burn's complete, Houston. The big boot.

01 06 39 28 CMP Okay. You want that to go to translation - we  
take that to 0.2, right?

01 06 39 32 CDR/LMP Yeah.

01 06 39 33 CMP Okay. No weight to make. I'll let you -

01 06 39 41 CDR Oh, man.

01 06 39 46 CMP You got it?

01 06 39 47 CDR You've got it.

01 06 39 48 LMP I've got it.

01 06 39 49 CMP It's off.

01 06 39 50 LMP Got a ..., John.

01 06 39 51 CDR Okay. Plus 0.1.

01 06 39 52 LMP Okay. ...

01 06 39 53 CDR Plus 0.1, minus 0, plus 1 [sic].

01 06 39 57 LMP Plus 0.1?

01 06 39 58 CDR Yeah. Minus 0, plus 0.1. And minus -

01 06 40 04 LMP DELTA-V<sub>C</sub> was plus or minus 3.1?

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Day 2

~~CONFIDENTIAL~~

Page 131

01 06 40 05 CMP Minus 3.1.  
01 06 40 08 LMP Okay, what was our trim attitude?  
01 06 40 10 CMP Okay, you got these? Okay, just hit ...  
01 06 40 16 CDR 9411, 35268 - -  
01 06 40 20 LMP Wait a minute.  
01 06 40 21 CDR Plus 09411 - -  
01 06 40 22 CMP Let - let's get some gimbals off.  
01 06 40 23 CDR Get the gimbals off ... here.  
01 06 40 25 LMP Okay, let's ... - -  
01 06 40 26 CMP MAIN B - -  
01 06 40 27 LMP Go ahead.  
01 06 40 28 CMP All right, MAIN B, number 1.  
01 06 40 29 LMP Good.  
01 06 40 30 CMP Number 2.  
01 06 40 31 LMP Good.  
01 06 40 32 CMP MAIN A.  
01 06 40 33 LMP Go.  
01 06 40 34 CMP Number 1.  
01 06 40 35 LMP Good.  
01 06 40 36 CMP Number 2.  
01 06 40 37 LMP Good.  
01 06 40 38 CMP Okay.  
01 06 40 39 LMP ...  
01 06 40 40 CMP SERVO POWERS are OFF. Got the residuals killed.

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01 06 40 42 LMP ...

01 06 40 43 CMP Okay.

## TIME SKIP

01 10 02 20 CMP You're just as clear as you can be.

01 10 02 33 CMP Go ahead.

01 10 02 35 SC ...

01 10 02 37 CMP Okay.

01 10 02 48 CMP Orion, Casper. Do you copy?

01 10 02 51 LMP Okay, I'm reading you 5 by, Casper. How me?

01 10 02 55 CMP Loud and clear.

01 10 02 56 LMP You're super.

01 10 03 57 LMP Okay. We're going BIOMED RIGHT. Okay, how do you read now, Pete?

01 10 04 03 CC ...

01 10 04 05 LMP Okay.

01 10 04 07 CDR **TELEMETRY** is LO; perform voice and low-bit-rate check.

01 10 04 11 LMP Okay. Do you want to - we can - we're down to step - 5 on page 1-118 - 1-18. Do you want to look at the bit rates some more?

01 10 04 37 LMP You do not? Roger. We're going to LO bit rate. Okay. The book says perform voice and low-bit-rate check with MSFN. How do you read?

01 10 04 53 CC ...

01 10 04 55 LMP Same-oh.

01 10 05 06 LMP Okay, Houston. Our FUNCTION - S-BAND FUNCTION is in VOICE now. How do you read?

**CONFIDENTIAL**

01 10 05 30 LMP Houston, how do you read with the FUNCTION at VOICE? Over.

01 10 05 36 CC Loud and clear.

01 10 05 37 LMP Okay, you're 5 by. And LO bit rate, how does it look?

01 10 05 52 LMP Okay. We're going to HI bit rate.

01 10 05 56 CDR How do you ...?

01 10 05 58 LMP Okay. We'll do the same thing with you. Voice check and high-bit-rate check.

01 10 06 22 LMP Houston, how do you read now? Over.

01 10 06 27 CC ...

01 10 06 30 LMP Okay. Give me a short count, please, Pete.

01 10 06 34 CC 5, ...

01 10 06 38 LMP Roger. You're very good. Okay, we're going to - bit rate is going LO, and we're going S-BAND RANGE to RANGING. Okay. How do you read now? Over.

01 10 06 53 CC Loud and clear.

01 10 06 55 LMP Okay. How is the ranging check going?

01 10 07 26 LMP Okay, Houston. Our ED bats are both GO at 37 volts, and the sequence camera works.



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## DAY 3

02 01 12 46 LMP MARK. Light streak - white streak in the right eye, upper center. Moving from up - -

## TIME SKIP

02 01 22 03 CMP Hello, there.

## TIME SKIP

02 03 57 53 LMP That's verified.  
02 03 57 55 CMP MAPPING CAMERA IMAGE MOTION is OFF.  
02 03 57 59 LMP That's verified.  
02 03 58 02 CMP That darn ... DATA SYSTEM is ON. PCM BIT RATE, HIGH?  
02 03 58 11 LMP Okay, go ahead.  
02 03 58 12 CMP System - S-BAND AUX TV to SCI?  
02 03 58 17 LMP Go ahead.  
02 03 58 19 CMP SM/AC POWER is coming ON.  
02 03 58 34 CMP Okay. MAPPING CAMERA is coming on to STANDBY.  
02 03 59 08 CMP Okay. Ready for MAPPING CAMERA and PAN CAMERA operations.  
02 03 59 17 LMP And that one.  
02 03 59 35 CMP Man, that peanut butter - -  
02 03 59 36 CC ...  
02 03 59 43 CMP - - peanut butter was really good.  
02 03 59 44 CC Okay, proceed, 16.

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Day 3

02 03 59 47 CMP Okay. MAPPING CAMERA is coming ON.

02 03 59 51 CDR I just might eat the peanut butter with no bread.  
How would that be?

02 03 59 57 LMP Borrow some.

02 04 00 00 CDR Can't find the bread.

02 04 00 06 LMP Got to.

02 04 00 07 CDR Yeah, I know it.

02 04 00 09 CMP And the PAN CAMERA SELF TEST is completed..

02 04 00 20 CMP Well, I - I saw the ... around here - this morning.

02 04 00 38 CDR ... you say is true - -

02 04 00 39 LMP ... peaches are delicious.

02 04 00 40 CDR Oh, that - -

02 04 00 42 CMP Charlie?

02 04 00 43 LMP Yeah. They're good. Want a bite?

02 04 00 52 CMP No, thanks.

02 04 00 53 LMP Want a bite, John?

02 04 00 54 CDR No, I just had some peaches. I had to throw mine  
in the jett bag ...

02 04 01 04 LMP What are you waiting for, a word from them?

02 04 01 05 CMP No. Waiting for the time to run out. Okay. The  
PAN CAMERA MODE barber poled and gone back to  
gray. That took about 40 seconds.

02 04 01 20 CC Roger.

02 04 01 27 CDR Now I lost my peanut butter. ... I lose some of  
my peanut butter.

**CONFIDENTIAL**

02 04 01 38 CMP I was only kidding. If you find it floating around, I bet you'll have a hard time finding the guy who hid it.

02 04 01 49 LMP It's really good. Peaches is one of the best things we have.

02 04 01 53 CDR ... good.

02 04 01 54 CMP MAPPING CAMERA to OFF.

02 04 01 58 LMP How did you cycle the film?

02 04 02 00 CDR I didn't.

02 04 02 01 LMP Huh?

02 04 02 02 CDR Ken did it.

02 04 02 26 CMP The - Was there something you wanted to say at the end of this thing, Charlie?

02 04 02 29 LMP Huh? No. I just wanted to be sure at the end of this thing that the MAPPING CAMERA to STANDBY MODE - -

02 04 02 33 CMP Huh? Oh - -

02 04 02 34 LMP - - on page 1-16 - -

02 04 02 35 CMP Oh, okay. While ... - -

02 04 02 36 LMP That's after - after you've cycled the PAN CAMERA switch.

02 04 02 40 CMP Yeah. Well, let me see the Flight Plan. Thank you.

02 04 02 44 LMP I ...

02 04 03 02 CMP Houston, do you copy Casper?

02 04 03 04 CDR I've just been contemplating ... - -

02 04 03 05 CC Read you loud and clear, Casper. Go ahead.

**CONFIDENTIAL**

02 04 03 07 CMP Okay.

02 04 03 08 CDR - - get to ...

02 04 03 09 CMP The next item here is to take the MAPPING CAMERA to the STANDBY MODE, and I assume I should do that before I turn the - SM/AC POWER OFF.

02 04 03 24 CC That's affirmative, 16.

02 04 03 28 LMP Can they see that down there? ...

02 04 03 34 CMP Yeah. Well, ... they can tell it, too.

02 04 03 42 LMP ... cyle.

02 04 03 44 CMP Could it take the cassette? Will it sit one place and still - corners it has to go around and ... cassette?

02 04 03 52 LMP You could have, yeah.

02 04 03 53 CMP Probably you would - -

02 04 03 54 LMP Wait, yeah.

02 04 04 00 CDR Oh-ho.

02 04 04 01 CC ... Casper. After you turn the MAPPING CAMERA to the STANDBY MODE, we want you to add PAN CAMERA SELF TEST to HEATERS.

02 04 04 12 CMP Okay. You've got HEATERS now, and we're in STANDBY, and I'm about to turn the SM/AC POWER OFF, unless you want me to hold it.

02 04 04 21 CC Leave it on, Casper. Leave that power on.

02 04 04 24 CMP Okay.

02 04 04 30 LMP ... he say ... STANDBY MODE that I leave it? ...

02 04 04 31 CDR ..., yeah.

02 04 04 32 LMP Uh-huh.

**CONFIDENTIAL**

Day 3

~~CONFIDENTIAL~~

Page 139

02 04 04 34 CMP Well, ...  
02 04 04 38 LMP I doubt it.  
02 04 04 39 CDR Number 2, a 3, a 4, a 5, a 6, ... all be ...  
02 04 04 52 LMP John, I tell you what I'll do ...  
02 04 05 00 CDR I'll ... - -  
02 04 05 01 LMP Wait a minute.

TIME SKIP

02 05 32 14 LMP That's signal strength for them.  
02 05 32 22 CMP Houston. Okay, we just got the signal strength  
on Orion.

TIME SKIP

02 21 40 19 CMP That's where not having had an opportunity to fly  
all these things really leaves me uncomfortable.  
02 21 40 25 CDR ... here?  
02 21 40 27 CMP Yeah. You know, it's just - like there isn't just -  
you know, no chance to relax and that's so ...  
02 21 40 31 CDR That's exactly the truth.  
02 21 40 33 CMP Every time you turn around, even if you want to  
pick your nose, you got to be careful that you do  
it in the right sequence.  
02 21 40 39 CDR Right ...  
02 21 40 43 CMP Well, I guess I broke the injector into the next ...  
- -  
02 21 40 45 CDR Yeah, the injector ...

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02 21 40 49 CMP Well. No. I - I don't think I - I'm not aware of anything I did in that injector that was wrong. I think the capture just broke.

02 21 40 57 CDR ...

02 21 40 59 CMP But - all the rest of that flapping around was due to my misinterpreting what I saw. I had visions of that nut coming off and filling the ... with water again. Okay.

02 21 41 17 CDR HIGH GAIN angles are PITCH, minus 25; YAW, 307. But we ain't there. Maybe the HIGH GAIN ...

02 21 41 21 LMP ... gonna slide right by us or something?

02 21 41 30 CDR Yeah.

02 21 41 31 LMP If it gets into red, is it gimbal locked?

02 21 41 34 CDR Well, it hasn't got a chance yet. Is the SPS gimbal locked, too?

02 21 41 40 CMP Yes, sir.

02 21 42 00 LMP I told you wrong.

02 21 42 03 CDR ... Got a GIMBAL LOCK light ...

02 21 42 20 CMP Okay. That happens before you get the - your red ball. Because when you hit the red dot, you do coarse align - or the maneuver stops, excuse me. You get this in - about 5 degrees - about 70 degrees and then 75 degrees, you stop the maneuver. At 85, you coarse align.

02 21 42 48 LMP How'd you make out?

02 21 42 50 CDR Just no way.

02 21 42 52 CMP Okay. Why don't you set these numbers in the GDC?

02 21 43 00 CDR ...

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Day 3

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Page 141

02 21 43 01 CMP Okay.

02 21 43 02 LMP ... some?

02 21 43 03 CMP Yeah.

02 21 43 04 CDR ...

02 21 43 05 CMP ... or something ... Co - What is it? Cotangent 90 degrees or something ...

02 21 43 13 CDR Yeah.

02 21 43 14 CMP Infinity minus 1. Some such - -

02 21 43 19 CDR Well, we'd better ... - -

02 21 43 20 CMP ... Yeah. Okay. How about FUEL CELL VALVES - REACTANT VALVES to LATCH. SM/AC POWER to OFF.

02 21 43 44 CMP Circuit breaker LOGIC POWER, two, close. Two, close. LOGIC POWER, two, to JETTISON. Oh, I'd hate to do this.

02 21 44 01 CDR Why? Ken - why?

02 21 44 05 LMP Why?

02 21 44 07 CDR Afraid you might jettison something besides the door?

02 21 44 09 CMP No, I want to make sure it doesn't. The momentary switches, unless they got - unless they have solder balls in them, you can't go. That can't go without a solder ball.

02 21 44 25 CDR Ken, ... one step away from jettison ...

02 21 44 29 CMP Yeah. I think I'm gonna stop right there - until we get our - until we do those things and actually torque to go for door jett. And all we have to do to jettison the door is - I'll take my LOGIC POWERS to JETTISON, and I'll jettison the door, and then we power back down. Be sure we check the propellant to see if we shook any of the - RCSs - -

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02 21 44 53 CDR Keep your eye on the REACTANT VALVES, Ken. You  
... - -

02 21 44 56 CMP We've got them in LATCH -

02 21 44 59 CDR Keep an eye on them anyhow.

02 21 45 00 CMP But - anyhow. That's right.

02 21 45 03 CDR What's the other thing, this talkback?

02 21 45 04 CMP Okay. These guys won't have talkbacks so we'll  
have to check these.

02 21 45 08 CDR ... close one.

02 21 45 10 CMP Yeah. We'll just do that as a matter of course.  
And that's all here in the checklist. I mean, it's  
not like - like we'll have to - we'll have to re-  
member these things.

02 21 45 21 CDR Yeah.

02 21 45 25 CMP Okay. Let's see, the other thing is the - oxygen  
and cryo - oxygen tank 3 and hydrogen tank 3 sit  
right on top of the service module door. So that's  
a good thing to be monitoring.

02 21 45 47 CDR Think we ought ...

02 21 45 59 CMP Okay. Turn the page and we'll see what's coming  
after this. ... Your left one's off. It's moving  
around ...

02 21 46 15 CDR ... over here ...

02 21 46 19 CMP Okay. I can do these things while I'm maneuvering.  
By definition, it's got to be 180 degrees. I've  
looked at the Flight Plan to check my ... maneuvers.  
Minimum 180 degrees. Yeah, ... into the computer.  
Okay. They haven't called up the - Well, I guess -  
pericynthian - plus 2 has the right weight and  
angles. We ought to get those before we get in  
there, I guess. Okay, we do this, we get the gyro  
- -

**CONFIDENTIAL**

02 21 46 52 LMP ...

02 21 46 54 CMP Yeah. Put - put the pad in the - in the book.

02 21 47 01 LMP The Updates Book?

02 21 47 02 CMP Yeah.

02 21 47 03 LMP That's what I was gonna do.

02 21 47 04 CMP It's still in here, too. Just in a useful place.  
Just ...

02 21 47 09 CDR Put that in there, too?

02 21 47 14 CMP The ... coming up. Let's just put these in here,  
just in the right place. Yeah, let me get moved up.  
We got an eat period in there. I'll change my  
sensors during the eat period. ... or something.  
Somewhere in here, we got to get - the cockpit ...  
set up for lunar orbit.

02 21 47 42 LMP Yeah.

02 21 47 43 CMP Then we'll get out our cameras and all that stuff.

02 21 47 45 CDR ...

02 21 47 46 CMP Yeah, I will need to use that mag but not until we  
get some stuff in here, get the booms and the ...

02 21 47 50 LMP Okay, ...

02 21 47 52 CMP ... me your lens.

02 21 47 53 CDR Are we using ...?

02 21 47 55 CMP Doesn't matter. ... Got to make a correction -  
orbital chart; and after that, sports fans, I  
think we're probably back in business.

02 21 48 22 CDR Okay. You want to take that door off, that boom  
off there?

02 21 48 28 CMP Okay. Do you want to see what kind of thing you've  
got to do out there? Doesn't look right.

**CONFIDENTIAL**

Day 3

02 21 48 35 CDR Yeah. Coming down.

02 21 48 40 CMP Yeah, it does. Okay. You want a - you want a helmet wipe? You want to - I - You want to wipe off all the little windows in the cockpit?

02 21 48 52 CDR We'll have to do that before we go into lunar orbit.

02 21 48 56 CMP Just wait and do it then? Do it when - because - ... off one of those visor wipes in just a minute.

02 21 49 02 LMP I don't ...

02 21 49 04 CMP I just want something I can clean the windows with. They're sticky. Need a whole bunch of them.

02 21 49 17 LMP ...?

02 21 49 18 CMP Okay.

02 21 49 43 CMP There you go.

02 21 50 02 LMP Okay?

02 21 50 03 CDR ...

02 21 50 13 CDR You want to take that window right there off ... shade? ...

02 21 50 23 CMP Charlie, ... by that power cable. These window shades work pretty good, but they still leak. They leak, but they get enough of a seal on them sometimes that it's hard to get ...

02 21 50 54 CDR ...

02 21 51 02 CMP What - what's wrong with getting a -

02 21 51 04 CDR ...

02 21 51 07 CMP Well. No.

02 21 51 16 CDR ... Call them up. Isn't that what you're gonna do?

02 21 51 22 CMP Yeah, we're only a couple of minutes late.

**CONFIDENTIAL**

02 21 51 29 CDR Are we?

02 21 51 31 CMP Aren't we supposed to go at 59?

02 21 51 34 CDR Yeah. ...

02 21 51 36 CMP Yeah? And maybe they'll - -

02 21 51 40 CDR Okay, Houston. Are we GO for SIM door jettison? Over.

02 21 51 52 CDR Okay. Have you got the LOGIC POWER enabled?

02 21 51 55 CMP No. I've got them - closed. They can't see it with the ... I'm down to here - three steps from jettison. There's - Okay. I was gonna hold up on that. I'll go ahead and give you a LOGIC POWER to JETTISON at this time.

02 21 52 26 CMP Here comes - LOGIC POWER JETT 1 to JETT, and number 2 to JETT.

02 21 52 36 CDR Okay, they're armed.

02 21 52 53 CDR Okay, understand. GO for door jett.

02 21 53 01 CMP Okay. And we checked that the cabin regs - emergency regs are set. They're in BOTH. The surge tank pressure looks good. Does it? Hey, Charlie, watch your - -

02 21 53 12 LMP Yeah.

02 21 53 13 CMP - - toes ...

02 21 53 15 LMP Yeah. ... Man, thank you.

02 21 53 17 CMP (Laughter)

02 21 53 20 LMP Okay. I'm ready with the camera.

02 21 53 22 CMP Okay. But really, we're about - 4 minutes out.

02 21 53 27 LMP Then let's go. Let's go. You have to be right on the second.

**CONFIDENTIAL**

02 21 53 34 CMP Well, I don't see any reason why we shouldn't do it on the second.

02 21 53 36 LMP Okay. Well, I'll get out of this position then.

02 21 53 39 CMP I'm sorry. I didn't realize you were in - Okay. Surge 3 - surge is good. Hydrogen pressures are good; quantities - there's 3 ... could be -

02 21 54 01 LMP Is there any more?

02 21 54 08 CMP No. That lower trajectory - probably going to have a hard time picking them up initially. You ought to go right out that way. And - there's a little particle that's just floating - look at that little guy just coasting along there, just sitting there.

02 21 54 33 CMP Okay, repress package is good.

02 21 54 51 CDR ...

02 21 55 06 CMP Okay, John, if you'll just give me a little countdown at 69:59.

02 21 55 12 CDR Okay.

02 21 55 18 CMP Why don't you get the platform ... There we go.

02 21 55 39 CDR ...

02 21 55 41 CMP Man, I feel like if going to P00 coarse aligned the platform - -

02 21 55 44 CDR Yeah.

02 21 55 45 CMP (Laughter) You know, the - the most natural thing in the world, the safest operation you can ever think of, is go to P00. And what happens? The platform coarse aligns.

02 21 55 59 LMP ... that attitude ...

02 21 56 04 CMP But according to my friend Murphy, it will occur just prior to the circ burn, just prior to the TPI - -

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02 21 56 12 CDR ... that.

02 21 56 14 CMP Yeah (laughter).

02 21 56 17 CDR I didn't realize ... circ burn that ...

02 21 56 20 CMP Oh, don't tell me. Sounded like they hadn't researched that one this way. Sounded like they'd researched it for the factors ... it's safe, you know, we aren't in ... - -

02 21 56 32 CDR Yeah.

02 21 56 33 CMP But you know what? I believe, just like the - you know, I think that the general attitude that we have seen, a one-in-a-million glitch, is probably quite correct.

02 21 56 47 CDR ... our luck.

02 21 56 50 CMP (Laughter) We - we uncovered - -

02 21 56 52 CMP - - somebody else's glitch. Well, that's part of the statistics, I guess. One in a million, when you've had yours, don't mean that you ain't gonna get the - that somebody hadn't gone 2 million hours without a - -

02 21 57 03 CDR ... down there since 1972. Now maybe zero g puts the little things closer to ...

02 21 57 12 CMP Yeah, maybe. There's so many subtleties to this program we ain't figured out yet. Lot of ..., very subtle things. That's why ... glitches. I'm just amazed that we worried about anything happening.

02 21 57 20 CDR Yeah, that's amazing. ... It's really ... Okay. A minute and 15 - -

02 21 57 48 CMP You notice, that signal strength doesn't stay as high as I thought it would, do you think? Has it ever come up full on the high gain, Charlie? Or is that as high as it's gotten?

02 21 57 57 LMP ...

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02 21 58 05 CMP Okay. It's up on a minute. Give me a call at 30 seconds.

02 21 58 17 CDR Okay.

02 21 58 31 CDR Thirty seconds to door jett.

02 21 58 34 CMP Thank you. I've got the switch guard up.

02 21 58 44 CDR I'll count you down from 10.

02 21 58 45 CMP All right.

02 21 58 52 CDR Ten, 9, 8, 7, 6, 5, 4, 3, 2, 1 -

02 21 59 01 CDR JETT.

02 21 59 02 LMP Man alive!

02 21 59 03 CDR/LMP There it goes!

02 21 59 04 LMP Beautiful. Beautiful!

02 21 59 06 CMP Can you see it?

02 21 59 07 LMP Yes, sir. Just great.

02 21 59 08 CDR Okay. Reac valves, you guys.

02 21 59 10 CMP Reacs - they're good.

02 21 59 12 CDR Okay. The door went, and I don't think anything changed much, from what we could tell.

02 21 59 18 LMP It was a big bang. Look at it spinning around in there. See it, Ken?

02 21 59 24 CMP Yeah.

02 21 59 25 CDR Can you see it?

02 21 59 26 LMP Yeah. Sure is beautiful.

02 21 59 28 CDR Oh. Yeah. You can see it out this window, too. Give me the camera quick. I think I can -

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02 21 59 32 CMP Oh.

02 21 59 33 LMP I got it right in the middle of the -

02 21 59 34 CDR You got it? Okay. That's beautiful.

02 21 59 39 CMP Yeah. There's the satellite and everything.  
(Laughter) Probably shouldn't tell them that.  
That'll scare them. That'll - that'll upset them.

02 21 59 47 CDR Okay, Houston. We can watch it spinning around  
out both the center window and Charlie's window,  
and it's - -

02 21 59 53 LMP Okay. Cameras ...

02 21 59 54 CDR - - quite a sight. Every time it comes around the  
bright side, the bright side front really flashes.

02 21 59 58 LMP Let's go over the checklist.

02 21 59 59 CMP I am. LOGIC POWER, two, OFF. SM/AC POWER coming  
on. FUEL CELL REACTANT VALVES to NORMAL.

02 22 00 13 LMP NORMAL. Go on.

02 22 00 15 CMP SERVICE MODULE RCS PROPELLANT talkbacks, eight, gray.

02 22 00 17 LMP They are all gray. Are we gonna ...?

02 22 00 22 CDR He already did.

02 22 00 24 CMP HELIUM talkbacks, eight, gray?

02 22 00 25 CDR Go.

02 22 00 30 CMP We got the SECONDARIES, CLOSED?

02 22 00 31 CDR Yeah.

02 22 00 32 CMP SELF TEST to HEATERS. Excuse me, Charlie.

02 22 00 36 LMP Sure.

02 22 00 39 CDR ... lose something ...

02 22 00 43 CMP ... When you find it floating around, I think  
you'll ... might not even get it.



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## DAY 4

03 02 22 33 CDR ..., Charlie, ...

03 02 22 44 CMP ...

03 02 22 47 CDR This where we ... here?

03 02 22 48 CMP Yeah.

03 02 22 50 CDR Yeah. You can turn it on ...

03 02 23 01 CMP Hey, we got something in that kit that'll clear your sinuses up?

03 02 23 05 LMP Yeah.

03 02 23 07 CDR Actifed.

03 02 23 08 LMP ...?

03 02 23 09 CDR Afrin ...

03 02 23 10 CMP ... you squirt in there to - -

03 02 23 12 LMP ...

03 02 23 13 CMP Yeah, I need to do something; this thing's getting worse.

03 02 23 18 CDR Well, we checked the switches three times. I guess it wouldn't hurt to check them again. (Laughter) Okay. ... popped.

03 02 23 27 LMP ...

03 02 23 30 CDR It's on panel 229 over there, Charlie. It's ... - -

03 02 23 33 LMP I ain't heard a thing pop.

03 02 23 34 CDR You ain't heard nothing pop?

03 02 23 36 CMP Interplanetary IOS [?]. ... plain ...

03 02 23 43 LMP Well, that'll ...

03 02 23 46 CMP Okay.

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Day 4

03 02 23 47 CDR Say that did kind of head out?

03 02 24 22 CMP Ooh. I think I was right.

03 02 24 29 CDR What's that?

03 02 24 30 CMP That guy had died. My nose ain't that stopped up. All that goes through is the odors, no oxygen.

03 02 24 47 CDR Whew! I see what you mean. That was me.

03 02 24 57 CMP Well -

03 02 25 27 LMP It's not - -

03 02 25 28 CMP Send that out of here.

03 02 25 30 CDR Smells a long time. ... You guys are putting that on the tape, too. ...

03 02 25 37 LMP (Laughter)

03 02 25 38 CMP Just be glad they don't have a gas inlet around here.

03 02 25 42 CDR That's right.

03 02 25 47 CMP Oh, machine, do your thing. I won't badmouth you for being a marshmallow again.

03 02 26 12 CDR Okay. Coming on 2 minutes.

03 02 26 23 CDR ... daylight, we'll see it.

03 02 26 27 LMP We going to burn, we come into daylight.

03 02 26 29 CDR Yeah.

03 02 26 30 CMP Don't look.

03 02 26 32 CDR No, don't look, we got too many - too many things going bad for us to look this time. Look after the burn. Get right there and then you get ... Phew!

03 02 27 24 CDR Okay, gonna do it right in 1 minute ... Stand by.

03 02 27 29 LMP There it is.

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03 02 27 30 CDR One minute. EMS ...

03 02 27 32 CMP TRANSLATION POWER, we don't need. The light is out. DELTA-V THRUST A is coming on -

03 02 27 39 CMP MARK.

03 02 27 40 CDR Okay.

03 02 27 55 CDR DSKY blank.

03 02 28 03 CMP Okay, average g is on. It's counting. Looks good, though.

03 02 28 19 CDR 10, 9, 8, 7, 6, 5 - 50 99 - -

03 02 28 26 CMP PRO.

03 02 28 27 LMP PRO.

03 02 28 28 CDR Took; 2, 1 - -

03 02 28 30 LMP A's open. SPS - Okay, lights are out.

03 02 28 33 CDR Okay.

03 02 28 34 LMP Pressure's looking good.

03 02 28 35 CMP Stable. Bank B.

03 02 28 36 LMP They're open.

03 02 28 37 CMP I felt a - seemed like they dropped.

03 02 28 38 CDR Where?

03 02 28 40 CMP Pressure is 90 on the gage.

03 02 28 42 LMP Pressure's looking great here. Helium valves are open. PUGS is looking good.

03 02 28 50 CMP I can feel that sucker bring that second bank on.

03 02 28 54 CDR Yeah, I felt that, too.

03 02 28 56 LMP Okay. We - I see it in the reflection in the LM windows.

03 02 29 00 CDR Keep your eye on them, babe.

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03 02 29 01 LMP I am. I got them, babe.

03 02 29 03 CMP What was the alarm at the start?

03 02 29 04 LMP It went out, whatever it was. I think it was a overpressure on the SPS; now it's back nominal.

03 02 29 09 CMP Okay.

03 02 29 12 LMP Okay, fuel's running a little low. It's running about 165. Coming up on a minute.

03 02 29 23 CMP Chamber pressure's staying, and - coming up a little bit, maybe. Up 92.

03 02 29 29 LMP MARK, 1 minute.

03 02 29 31 CMP Okay. Doesn't register on the g meter (laughter). Okay, gimbals are still steady.

03 02 29 41 LMP Okay. Stand by -

03 02 29 42 LMP MARK. Loose limit.

03 02 29 46 CDR ...

03 02 29 50 CMP Chamber pressure's going up a little.

03 02 29 56 CDR ...

03 02 29 58 CMP Yeah, I gave you bum dope. I was calling that 90, but it was 95.

03 02 30 01 CDR Son of a gun.

03 02 30 02 CMP Inside.

03 02 30 03 CDR Inside.

03 02 30 05 LMP ... 130.

03 02 30 06 CMP That's really 96 psi on the chamber pressure.

03 02 30 11 LMP PUGS is looking great.

03 02 30 12 CMP Attitudes are holding. How do the two DELTA-Vs compare, John?

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03 02 30 18 CDR DELTA-Vs compare pretty close, as matter of fact.  
...

03 02 30 21 CMP Measurables ... I mean, to go.

03 02 30 23 CDR Yeah, yeah.

03 02 30 25 CMP About 10.

03 02 30 26 CDR Yeah, 10 apart. Lot closer than in the simulator.

03 02 30 29 CMP ... Okay.

03 02 30 30 LMP MARK, 2 minutes.

03 02 30 31 CDR ...

03 02 30 32 CMP ... coming down.

03 02 30 41 CMP Trim's ... Chamber pressure, 97.

03 02 30 47 CDR Okay. What's the cut-off?

03 02 30 49 CMP BMAGs look good.

03 02 30 50 LMP Four - about 04:15.

03 02 30 51 CMP Four - yeah. 04:30.

03 02 30 52 LMP 04:20, actually.

03 02 30 53 CDR Yeah. You're gonna make me nervous ...

03 02 30 57 CMP When I say what?

03 02 30 59 LMP MARK; 02:30.

03 02 31 01 CDR Okay.

03 02 31 05 CMP ... - -

03 02 31 06 LMP CMC's right on, with my time. PUGS is about 100,  
unbalanced, and holding. Decrease.

03 02 31 21 CDR ... Looks like it's working, doesn't it?

03 02 31 22 CMP Man, it sure does.

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03 02 31 24 LMP Okay, coming up on 3 minutes - -

03 02 31 25 CMP ... (laughter). Chamber pressure - -

03 02 31 29 LMP MARK.

03 02 31 30 CMP - - 78.

03 02 31 31 LMP Okay, we got 150 on the PUGS, unbalanced, decrease.

03 02 31 34 CMP Okay. Don says that if we watch it go, it'll go down to about - almost 200 and then work its way back up.

03 02 31 40 LMP Okay.

03 02 31 43 CDR Okay. Three minutes. Right on time.

03 02 31 47 CMP Man, that thing is - their prediction is right on this.

03 02 31 50 CDR Yeah.

03 02 31 51 CMP Isn't that beautiful?

03 02 31 52 LMP ... heard of it.

03 02 31 53 CDR ...

03 02 31 54 LMP Okay, coming up on 03:30.

03 02 31 56 CDR EMS and the DELTA-V to go are right together. Perfect.

03 02 31 59 LMP MARK; 03:30.

03 02 32 02 CMP Chamber pressure's at 98.

03 02 32 06 LMP Stand by for the tight limits -

03 02 32 07 LMP MARK. Tight limits. We're at 200; unbalanced; jiggling around a little bit; decrease.

03 02 32 20 CMP Okay, ...

03 02 32 23 LMP Coming up on 4 minutes. SPS pressures are rock solid.

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03 02 32 29 LMP MARK; 4 minutes.

03 02 32 31 CMP Inside (laughter).

03 02 32 32 LMP I'm not, I'm looking at the gages. I was having a little bias back there. Okay?

03 02 32 39 CDR Okay, and now for ...

03 02 32 40 LMP Stand by for crossover.

03 02 32 43 CDR EMSs and this thing are right together. Couldn't be any closer.

03 02 32 47 LMP It looks like we've had crossover.

03 02 32 49 CMP Okay. My chamber pressure very smoothly increased to 100.

03 02 32 53 LMP Okay, and the unbalance went a back - that's jiggling around on zero. Stand by.

03 02 32 59 LMP MARK; 04:30.

03 02 33 05 CMP Man, that mental machine.

03 02 33 07 CDR Keep doing it, machine.

03 02 33 24 LMP Coming up on 5 minutes.

03 02 33 29 LMP MARK; 5 minutes. Unbalance is 150, decrease. Looking great.

03 02 33 34 CDR ... to go.

03 02 33 39 LMP Helium's down to 1800. Nitrogen's looking great.

03 02 33 45 CMP Man, that time is gonna be 06:14.

03 02 33 47 CDR Sure is.

03 02 33 51 CMP Casper, you're gonna lose your bar [?].

03 02 33 54 CDR That's really spectacular.

03 02 33 56 LMP Okay. Stand by, on 05:30.

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03 02 33 59 LMP MARK; 05:30.

03 02 34 05 CDR At shutdown, maybe we can get another light ...

03 02 34 09 CMP Yep.

03 02 34 10 LMP Okay. Rock solid. Thirty seconds.

03 02 34 16 CMP Not gonna get there early. Got 10 seconds overburn to worry about.

03 02 34 20 LMP Yeah. 100, decrease, unbalance, looking super, 40 percent. Six minutes -

03 02 34 29 LMP MARK.

03 02 34 31 CDR ...

03 02 34 33 LMP 06:05 -

03 02 34 34 LMP MARK. 06:10, 11, 12, 13, 14, 15 - -

03 02 34 45 CDR Auto shutdown.

03 02 34 46 LMP - - 15.1 - -

03 02 34 47 CDR MASTER ALARM.

03 02 34 48 LMP RCS pressure.

03 02 34 49 CDR RCS pressure.

03 02 34 50 LMP It's okay.

03 02 34 51 CMP Okay. Two, 3 - -

03 02 34 52 LMP It went high on the - -

03 02 34 53 CMP - - 4. Okay. We've done our thing. We didn't get anything here. You want to - -

03 02 34 57 CDR ...

03 02 34 58 CMP - - copy those numbers? Two, 3, 28039.

03 02 35 01 CDR Yeah.

03 02 35 05 LMP Okay. What, 28039?

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03 02 35 07 CMP Yeah, 28039.

03 02 35 10 LMP They're okay.

03 02 35 11 CMP Okay.

03 02 35 14 CDR Plus 0.2, minus 1 - minus 0, minus 1. We got to look at 1620, right?

03 02 35 21 LMP ... 5.5.

03 02 35 22 CDR 1620.

03 02 35 23 LMP You're not gonna trim.

03 02 35 24 CDR No, but - -

03 02 35 25 CMP Okay, get the - DELTA-Vs now - I mean, DELTA-V, 20.

03 02 35 28 CDR That just call a NOUN 20?

03 02 35 30 CMP Yeah, VERB 6.

03 02 35 34 CDR Okay. ENTER. Okay, now let's - Roll's fine - -

03 02 35 40 CMP ...

03 02 35 41 CDR - - ... 02. 35799.

03 02 35 42 CMP Yes.

03 02 35 44 CDR Plus 26.8.

03 02 35 45 CMP Yes.

03 02 35 46 CDR That's good. You get that?

03 02 35 47 LMP Good, yeah. Let's go with the gimbal motors.

03 02 35 50 CMP Okay. Wait a minute now. Let me see if we got everything here. GIMBAL MOTORS, four, OFF. Okay. MAIN B.

03 02 35 53 LMP Go.

03 02 35 54 CMP One.

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03 02 35 55 LMP It's OFF.

03 02 35 56 CMP Two.

03 02 35 57 LMP It's OFF.

03 02 35 58 CMP MAIN A.

03 02 35 59 LMP Go.

03 02 36 00 CMP One.

03 02 36 01 LMP Go.

03 02 36 02 CMP Two.

03 02 36 03 LMP Go. Both OFF.

03 02 36 04 CMP Okay. SERVO POWER. Go ahead and go to P00. I'll do this one. Two, OFF.

03 02 36 09 LMP ... on.

03 02 36 10 CMP Okay, hand controllers are locked. DIRECTs, OFF.

03 02 36 13 CDR OFF.

03 02 36 14 CDR That's off.

03 02 36 15 CDR OFF. DIRECT POWER, OFF.

03 02 36 16 CDR/CMP DIRECT ULLAGE - -

03 02 36 17 CMP - - was never closed.

03 02 36 18 CDR Circuit breaker, PITCH 1, YAW 1. I sure got that.

03 02 36 24 CMP/CDR Okay, did we get all that?

03 02 36 25 CDR EMS FUNCTION, OFF. STANDBY.

03 02 36 27 CMP STANDBY ...

03 02 36 29 CDR PRO.

03 02 36 30 CDR/CMP ATT DEAD BAND to MAX.

03 02 36 32 CMP BMAGs, three, to RATE 2. BUS TIES are OFF, Charlie?

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03 02 36 37 LMP Yeah.  
03 02 36 39 CMP Okay, the BIT RATE - -  
03 02 36 40 LMP Going LOW.  
03 02 36 41 CMP Okay.

## TIME SKIP

03 03 27 43 CMP You want to do one?  
03 03 27 44 CDR Huh? Do I?  
03 03 27 45 LMP Well ...  
03 03 27 46 CMP You should be able to. Be right at the terminator.  
03 03 27 51 CDR Right at the terminator, huh?  
03 03 27 52 CMP Yeah.  
03 03 27 53 CDR Trouble with the terminator, this Moon is so ragged,  
I can't - do it even. I'll get a decent terminator  
shot.  
03 03 28 05 CMP I'll take care of all that. Okay, there's Taylor,  
Taylor A ... Zöllner - then we have to have ...  
Descartes. That is Descartes, right there. See  
the - ...?  
03 03 28 27 CDR Where?  
03 03 28 28 CMP Right down - Here, let me - get to this window;  
I'll show you. Right there? The crater Descartes  
- -

## TIME SKIP

03 04 17 54 CMP Well, I guess that - that sort of makes 6 days of  
PTC not so bad.

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03 04 18 25 CMP Let's see, I ought to be able to do both of these at the same time, or can I? Tsk, tsk, tsk, tsk, tsk, tsk, tsk.

03 04 18 32 CDR Both of what?

03 04 18 33 CMP Both these dumps.

03 04 18 34 CDR ...

03 04 18 35 CMP ... separate.

03 04 19 27 CMP What time was our - AOS - I mean, sunrise?

03 04 19 34 CDR Sunrise -

03 04 19 47 CMP Just look at the Flight Plan, there. ...

03 04 19 50 CDR You hope.

03 04 19 52 LMP We got to get going here, I'll tell you. ...

03 04 19 55 CMP Well, we've got at least 20 minutes, Charlie.

03 04 19 57 CDR Charlie, ... Okay. AOS ... LOI, 74 - -

03 04 20 05 CMP No, no, no, no. Look at the Flight Plan where the column stops. It goes from black to white.

03 04 20 13 CDR Oh. Okay. 76:18 ...

03 04 20 30 LMP Sunrise?

03 04 20 32 CDR I don't know. No, it's - -

03 04 20 35 LMP 76:28, man.

03 04 20 36 CMP No, couldn't be.

03 04 20 39 CDR Well, it - if it goes to black to some other squiggly line, what is that squiggly line? It goes from black to a squiggly line. Okay. And then it becomes full sunrise at 76:35.

03 04 21 04 LMP Okay, what settings do I use on this color? I don't see how this can show that terminator with color film.

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03 04 21 16 CDR Have any ...?

03 04 21 22 LMP Hm.

03 04 21 32 CMP ...

03 04 21 43 CDR No, you admit my ability to read the chart. It's wrong. (Laughter) One small step for mankind, here. What do you make it out to be, Charlie?

03 04 21 57 LMP 76:28.

03 04 21 59 CDR Is that when it gets daytime? Or get sunrise?

03 04 22 02 LMP That's our sunrise.

03 04 22 04 CDR Our sunrise. Well, that can't be sunrise, man. He ain't gonna believe that. That's because you're looking at it ... which you ain't gonna ever see again (laughter). Every time we did this on Apollo 10, a FUEL CELL light came on; every time we ... And I was totally ignorant of what the fuel cell ... in here somewhere ...

03 04 23 05 CDR Where are the scissors ...?

03 04 23 07 LMP I put both pair down there in the ...

03 04 23 24 CMP ...

03 04 23 53 CMP Here ...

03 04 24 24 CMP Okay. That's what we need to know.

03 04 25 39 CDR Did we stop logging our intake and all that stuff today?

03 04 25 42 CMP Yep. Did that this morning. I mean, after the first ... What time did they say we get the AOS? About -

03 04 26 05 LMP He didn't say.

03 04 26 08 CDR I never said.

03 04 26 11 LMP Neither did the ground.

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03 04 26 15 CDR They're supposed to give us a rev 2 update for that stuff, and they did, didn't they?

03 04 26 19 CMP No, I don't think they're supposed to.

03 04 26 22 CDR Start coming out ...

03 04 26 24 CMP Yep. It's altered in the Flight Plan.

03 04 26 28 CDR I guess this is the real crux. If you don't get around on this rev, they've really screwed up.

03 04 26 36 LMP We had ... terminator I'm supposed to take a picture of.

03 04 26 39 CMP Then what?

03 04 26 40 CDR Yeah.

03 04 26 41 CMP You want me to take a picture of Crookes or not?  
I - I - -

03 04 26 43 LMP Go ahead.

03 04 26 44 CMP I ...

03 04 26 45 LMP I don't want you to take a picture of anything;  
... asked - -

03 04 26 46 CDR ... asked us to ask you to take a picture of it.

03 04 26 49 CMP Oh. He did. Okay, ...

03 04 26 52 CDR Please tell those guys - please tell Ken - -

03 04 26 55 LMP Exactly what he said.

03 04 26 56 CDR - - that - -

03 04 26 58 LMP We're sorry he doesn't want to.

03 04 26 59 CDR What he said was, "I'd like to get a picture of Crookes." He said, "There's a possibility that you guys may be able to pick it up, depending on whose window you're sitting in at the time. I know Ken looks at it, but I don't know if you do or not; but if you happen to be sitting there and

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it comes around, why don't you get a picture of it?" That's what he said. On account of something, I forget what. ...

03 04 27 30 LMP I'm proud of you.

03 04 27 31 CDR ...

03 04 27 35 CMP Now, how about putting the 215 lens on there?

03 04 27 39 LMP Okay. Is that our waste water tank?

03 04 27 43 CDR Yeah. ...

03 04 27 45 LMP Still got 20 percent more to go.

03 04 27 51 CMP Don't - don't ... (laughter).

03 04 27 56 CDR I'm not able to tell that they're doing any of that.

03 04 28 37 CMP You're right. That's a - that's a rather startling sunrise, isn't it?

03 04 28 45 CDR Waste water ... 20.

03 04 28 57 LMP Okay, it's on, Ken.

03 04 29 00 CDR You want to get over here, Ken?

03 04 29 01 CMP ...

03 04 29 02 LMP It's out of this window. Crookes's supposed to be.

03 04 29 06 CMP It should be out - out of here or there, either one. This seems to be fine.

03 04 29 21 CMP ... I have one at ...

03 04 29 29 CDR Okay, we got our fuel cell purge now?

03 04 29 31 LMP No. I'm gonna start it right now.

03 04 29 34 CMP Okay. Let's see, get - get the - Suppose we could use magazine SS? That other one.

03 04 29 42 LMP That one's the magazine you want to use for this?

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03 04 29 45 CMP Yeah.

03 04 30 02 CMP Okay, and this is gonna be ... 7 ... 6 ... okay ... SPS pressure.

03 04 30 24 LMP Going up, you mean?

03 04 30 25 CMP I put it to acknowledge [?] because it was on continuously. Must be ... It looks like it's gonna go higher. It's about 210 now.

03 04 30 36 LMP Well - Yeah, if the light was on, though, it should come back on again.

03 04 30 39 CMP It may have gone off from being cooled down.

03 04 30 41 LMP Yeah. Okay. Probably.

03 04 30 44 CDR Take a look in there. The condenser's normal. ...

03 04 31 00 LMP Starting to open the purge. ... Maybe we better turn off the waste water dump.

03 04 31 05 CMP Okay, I'll get it. What's that?

03 04 31 11 LMP Fuel cell 1. Okay.

03 04 31 15 CMP Have you already done the - -

03 04 31 17 LMP It's did with the purge.

03 04 31 18 CMP Oh. All right. Okay. Okay. This is off.

03 04 31 23 LMP Okay, right at 10.

03 04 31 43 LMP Man, we are streaming out a lot of particles with us. Okay, this terminator's coming up, Ken.

03 04 31 51 CMP Okay. I'm coming. Well, we're not gonna be directly over it until about 34, which is 2-1/2 minutes.

03 04 32 17 LMP You wouldn't believe all the particles we've got.

03 04 32 20 CMP Look at that! Real pretty.

03 04 32 31 LMP I'm gonna let you get the ... I'll get the ...

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03 04 32 40 CMP Well, it's not clear to me we're gonna get anything here.

03 04 32 45 LMP That's really spectacular. Oh, this is beautiful! Contrast.

03 04 33 08 LMP H<sub>2</sub> purge, MASTER ALARM.

03 04 33 10 CDR ... that one.

03 04 33 19 LMP See it coming, Ken?

03 04 33 21 CMP Get these. I'm not sure it's - Harry [?] wants pictures of stuff like that. ... Get one here of this - these guys right here in the bottom of this thing. That should be ...

03 04 33 43 LMP Look at the depth of that crater!

03 04 33 46 CMP Except for the full Sun, it makes it look very - very - -

03 04 33 49 CDR A lot deeper than it is.

03 04 33 59 CMP ... picture.

03 04 34 01 LMP ... on?

03 04 34 03 CMP No. Thank you.

03 04 34 09 CDR Here's where they turn into hills.

03 04 34 15 CMP ... take a couple of pictures here. ... Excuse me.

03 04 34 26 LMP Sure.

03 04 34 42 CDR There's that central peak in Icarus.

03 04 34 48 CMP Have you got Icarus?

03 04 34 50 CDR Right out there on the right. You didn't see that, Charlie.

03 04 34 54 LMP Oh yeah, I see it. It's taller than a - There it is. Right there. See it?

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03 04 35 01 CDR It isn't really taller.

03 04 35 04 LMP Right out here. Right on - almost on ... horizon.

03 04 35 07 CMP Yeah.

03 04 35 31 CMP Okay, Charlie. ...

03 04 35 47 CDR Why does it look rounder coming around this way than it does when you go into the terminator; it looks straight on the other side.

03 04 35 54 CMP There's some suspicion that there's a different material.

03 04 35 58 CDR All right. Just wanted to ask ... Did I say the middle of Icarus looks like a big ... volcano? Couldn't.

03 04 36 28 CMP What did you call it? Icarus?

03 04 36 30 CDR Yeah.

03 04 36 53 LMP H<sub>2</sub> purge, MASTER ALARM. ...

03 04 37 09 CMP Let's see, we're about 37:06 and there's -

03 04 37 34 LMP What's a flashing 37 doing there?

03 04 37 38 CDR Ken will figure it out for you.

03 04 38 11 CDR ... out there.

03 04 38 29 CDR Looking at the Moon hurts my head. I won't look at it. There's too much down there I don't understand.

03 04 38 45 CDR Charlie, just keep ... on the book.

03 04 38 48 LMP That's why I'm purging the fuel cell.

03 04 38 50 CDR Oh.

03 04 39 02 LMP I tell you, when we get down to 8 miles, we're gonna really look like we're down among them.

03 04 39 08 CDR Sure are.

03 04 39 16 LMP What PTC ... Ken?

**CONFIDENTIAL**

Day 4

~~CONFIDENTIAL~~

Page 169

03 04 39 20 CMP Yeah. ...

03 04 39 39 CMP Okay. Get back here, Charlie.

03 04 40 32 CMP Okay. I guess I can turn that purge - that waste water dump off.

03 04 40 38 CDR Stuff is coming out, Ken.

03 04 40 40 CMP It is?

03 04 40 41 CDR Yeah.

03 04 40 42 CMP Okay. Our waste off.

03 04 40 57 LMP ...

03 04 41 20 CMP Okay; we get the AOS at-

03 04 41 27 CDR It really fires thrusters ...

03 04 41 33 CMP ... firing thrusters.

03 04 41 36 CDR Uh-huh.

03 04 41 37 CMP Yeah. What do you - what made the comment that you said was really firing one of the thrusters?

03 04 41 43 CDR ...

03 04 41 44 CMP Oh.

03 04 42 18 LMP ...

03 04 42 40 CDR ...?

03 04 42 41 LMP Yeah.

03 04 42 42 CDR Well, I don't know. I don't know.

03 04 42 55 CDR ...

03 04 43 03 CMP They all look different to me when I go hanging upside down.

03 04 43 06 LMP ...

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03 04 43 07 CMP I know they're not supposed to, but they sure do.

03 04 43 08 LMP Sure do ...

03 04 43 13 CMP Look at those little tracks down there running in between these two craters.

03 04 43 52 LMP ... big blocks ...

03 04 43 59 CDR Seen with the naked eye from 60 miles, they've got to be big. ...

03 04 44 03 LMP They're really big.

03 04 44 05 CMP Which one are you looking at?

03 04 44 06 LMP ...

03 04 44 07 CMP Oh.

03 04 44 10 LMP And it has a ray ...

03 04 44 13 CDR I have to agree that the back side is rather monotonous looking, although I'm sure each one of these craters tells us something, if you're smart enough to know what's going on.

03 04 44 24 CMP Wish I could clean this window.

03 04 44 26 CDR Isn't that terrible? Wonder how that happened?

03 04 44 30 CMP I don't know. It's on the outer pane.

03 04 44 32 CDR Yeah. Inside of the outer pane.

03 04 44 35 CMP Yep. It really makes a difference with the binocs.

03 04 44 39 CDR Yeah.

03 04 44 45 CMP Man, those are huge features.

03 04 45 02 CDR What gets me is the ridge - is the - is the ridge line rou - around ... Man, there is just not a flat place anywheres. Do we go over Gagarin?

03 04 45 16 CMP No.

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03 04 45 17 CDR I didn't think so. We're coming up on something like Mendeleev now? Probably?

03 04 45 25 CMP Uh -

03 04 45 28 CDR That big flat thing right there.

03 04 45 30 CMP Looks about right.

03 04 45 41 CDR You want to get a picture of the Sea of Moscow? Anybody gotten any good pictures of it?

03 04 45 47 CMP ... we have enough Sun.

03 04 46 31 CMP AOS? Maybe we should turn this thing off before AOS.

03 04 46 38 LMP The dump?

03 04 46 39 CMP Yeah. ... - -

03 04 46 40 LMP Am I looking up north for that?

03 04 46 43 CDR You're looking up north. Yeah, you're looking north.

03 04 46 48 CMP Is there still stuff coming out of our dump?

03 04 46 50 CDR No. It's about to stop.

03 04 46 52 CMP Okay.

03 04 47 20 CDR Want me to get a picture of it on the right?

03 04 47 22 CMP Sure.

03 04 47 23 CDR It really makes a - Give - give me a thing.

03 04 47 25 LMP ...

03 04 47 27 CMP Okay.

03 04 47 28 CDR What should I take it at?

03 04 47 30 CMP I don't know, John, I'll have to go and see, here.

03 04 47 33 CDR This can't use 250 at f/11?

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03 04 47 35 CMP I'd better dump it.

03 04 47 38 CDR Okay.

03 04 47 40 CMP I ain't sure that's the right thing, but I know it - -

03 04 47 44 CDR This is probably about right for right in here.

03 04 47 47 CMP Where did my little wheel go?

03 04 47 51 LMP Here's one right here, Ken.

03 04 47 52 CMP ... Thank you. Well (laughter) -

03 04 47 56 CDR Will a 250-millimeter lens get it?

03 04 47 58 CMP John, I don't - I can't see through you, I don't know. But I would think that on the horizon you get most anything because - -

03 04 48 05 CDR Yeah, but that's a long ways out.

03 04 48 06 CMP ...

03 04 48 13 CDR No, I'll do it ...

03 04 48 16 CMP ... Ten-year medals for free.

03 04 48 25 CDR ... tracking that out ...

03 04 48 26 CMP ... Right?

03 04 48 33 LMP This is the most unique crater I've ever seen; the one right here with the black rim. It's all white except for the rim. See that bright crater.

03 04 48 42 CMP Yeah, yeah. That's - that big crater is Chaplygin and the - -

03 04 48 45 CDR Okay. That was the Sea of Moscow. Excuse me.

03 04 48 49 CMP Okay.

03 04 48 50 CDR Whatever that means.

03 04 48 52 LMP Take any good pictures yet?

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03 04 48 53 CMP Yes. ... - -

03 04 48 56 CDR ... handle it ... Soviets ... eat their heart  
out ...

03 04 49 04 CMP If they come, I bet they don't quit.

03 04 49 09 CDR ... - -

03 04 49 11 CMP You - you -

03 04 49 12 CDR - - ...

03 04 49 18 LMP You know, this window 5 is a little foggy on the  
outer pane, too.

03 04 49 21 CDR Yeah.

03 04 49 22 LMP Just a little.

03 04 49 32 CMP What frame number was that?

03 04 49 36 CDR That frame number was number 4. ... number 4.

03 04 49 50 LMP Now, we're gonna be able to see earthrise right  
now.

03 04 49 59 CMP ...

03 04 50 00 LMP You want to get a picture of earthrise?

03 04 50 03 CDR Well, probably not. There's probably only been  
10 million pictures already took of it. But if  
you're looking for PR, like the Sea of Moscow or  
some other thing ...

03 04 50 19 CMP What'd you take it at, 1/250? f/11 - f/8? John?

03 04 50 25 CDR I put it 1/250 at f/11. f/8 was probably a better  
choice.

03 04 51 04 CMP Okay, ... Let me get it set.

03 04 51 08 LMP ...

03 04 51 09 CDR Yeah, pitch, 10, and yaw, 355. We pick them up on  
OMNI C, and then we'll shift over.

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03 04 51 14 LMP Yeah, we can do that.

03 04 51 32 CMP Okay. And in a few mintes, we're gonna do our systems checks. Huh?

03 04 51 38 LMP ...

03 04 51 39 CMP Yeah. Okay, we're gonna do our systems checks for DOI. Another one of these things we can get started early.

03 04 51 57 CMP Dang it. ... window screwed up like that? It's really ...

03 04 52 05 LMP I can't believe it.

03 04 52 08 CDR What's that, Charlie?

03 04 52 09 LMP That that's the fu - (laughter) - Tape recorder - that that's the Moon down there.

03 04 52 17 CDR It's the whole thing.

03 04 52 19 LMP The whole thing. I thought we'd see Tsiolkovsky this rev. Oh, yeah.

03 04 52 31 CMP It comes again.

03 04 52 32 LMP That right? Oh, yeah.

03 04 52 36 CDR Yeah, I imagine when the Soviets start up here, they'll set up their lunar base in the first place; stay for a while.

03 04 52 46 CMP Now that's really frustrating.

03 04 52 48 LMP I can't understand what ... doing out over that way.

03 04 52 51 CDR Man, there sure is a lot of things up here that I don't understand. Look at that big crater down south with the rocks in it. Or - you - you're looking right at it. It's got layers of walls there.

03 04 53 05 CMP Which direction? That bright one there?

03 04 53 06 CDR Yeah, the bright one. With the lay - it's got layers of walls in it. I don't know what the

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name of that one is. It looks like - you get a little higher Sun angle, it looks like anthracite coal laid in against chalk. It doesn't look that way right now.

03 04 53 21 LMP It's really a unique crater chain down there. Really - ... south of track.

03 04 53 29 CDR ...

03 04 53 36 CMP Okay, is that -

03 04 53 37 CDR Yeah, that's ... right there.

03 04 53 46 CMP Well, that's not - those crater chains there. Let's see, we just passed ... probably?

03 04 53 56 CDR I just can't get it.

03 04 53 58 CMP Try it again. You got King? Isn't that King back there?

03 04 54 05 LMP ...?

03 04 54 06 CDR Right out to the left.

03 04 54 08 LMP I don't see it. It may be in your window.

03 04 54 09 CDR Yeah.

03 04 54 23 CMP Way out there.

03 04 54 24 CDR Where?

03 04 54 25 CMP Way out there, yeah.

03 04 54 26 CDR Okay, I'm looking - right there.

03 04 54 30 CMP Yeah. I can see it.

03 04 54 33 LMP ... What do you think about King?

03 04 54 37 CMP See, it's got kind of funny little things in it - -

03 04 54 39 LMP (Sneeze)

03 04 54 40 CMP - - ... that - things that look like lava flows -

03 04 54 43 LMP (Sneeze)

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03 04 54 45 CDR But they've got to be lava flows running down the side of that mountain there - -

03 04 54 47 LMP (Sneeze)

03 04 54 48 CDR - - whatever made that crater.

03 04 54 50 CMP It's pretty big.

03 04 54 51 LMP Oh, yeah, yeah, yeah. It's got to be lava flows.

03 04 54 54 CMP Okay. These crater chains running down here should lead down to Tsiolkovsky.

03 04 55 02 CDR Yeah. ...

03 04 55 05 LMP They do! Aha! There it is! ...

03 04 55 11 CDR Okay, there's ...

03 04 55 14 CMP Oh, hey, that is pretty - -

03 04 55 15 LMP Isn't that something? ... - -

03 04 55 16 CMP Isn't that a beauty?

03 04 55 17 CDR Yeah, dang.

03 04 55 18 CMP That - that must be one of the more spectacular things that ... here.

03 04 55 22 CDR Oh, you bet.

03 04 55 26 CMP Well, I'd cancel the earthrise here.

03 04 55 28 CDR Okay. Okay.

03 04 55 31 CMP What a treat. And so many things, I can't get. I'm like a little kid with ice cream; I don't know where to start.

03 04 55 37 CDR Right.

03 04 55 41 LMP Oh, these windows are just really frosting.

03 04 55 45 CDR Should be AOSing here pretty quick.

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Day 4

03 04 55 47 LMP Yeah.

03 04 55 48 CDR Shouldn't we, Charlie?

03 04 55 50 CMP Not until we get earthrise.

03 04 55 54 CDR ... what I mean. We were talking to them about King the last time we came across here.

03 04 56 01 CMP We should get AOS at King. Now is that Thesaur [?]?

03 04 56 03 CDR No, that's not Thesaur [?]. There's Thesaur [?]. Thesaur's [?] right here.

03 04 56 09 LMP Ken, is it that little bright one right down there south of King?

03 04 56 11 CMP That's what I was just wondering, but I think that Thesaur [?] is supposed to be bigger than that.

03 04 56 17 CDR ... could be ... the rays probably coming out of the King.

03 04 56 20 LMP Yeah.

03 04 56 21 CDR It looks like it goes in the same sort of a ... See those bright things on the bottom of it?

03 04 56 25 LMP Yeah. ...

03 04 56 38 CDR ... know what this ... and how all this happened.

03 04 56 43 CMP Look at this - I never noticed this before. We got a crater chain. It goes from here, right straight to the horizon.

03 04 56 48 LMP Yeah. Right along the track.

03 04 56 50 CMP Yeah? I never noticed that.

03 04 56 54 CDR Well, you ain't been here but a few hours.

03 04 56 57 SC (Laughter)

03 04 56 59 CDR Right straight to the horizon?

03 04 57 00 CMP Yeah. There's a - it starts down here.

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03 04 57 02 LMP South of Thesaur [?].

03 04 57 04 CMP And these two - see these two craters?

03 04 57 05 CDR Yeah.

03 04 57 06 CMP It's almost right in the center of this window.  
Starts - And these two craters are together.

03 04 57 10 CDR Yeah.

03 04 57 11 CMP And then it cuts down here and it goes towards the  
horizon and stops at the mare.

03 04 57 22 LMP Better get ready to ...

03 04 57 25 SC (Cough)

03 04 57 43 LMP While we were - while we were ... I guess the  
weight was 25 pounds, 10 percent.

03 04 57 58 CMP Man, it's frustrating when one of these things  
pops those things in and out. Wonder what it is  
that makes it do this; it doesn't do it when you  
look at it. It only does it when you hit the  
binoculars. One other picture.

03 04 58 09 LMP Waste water dump still open?

03 04 58 11 CDR No. Better not be. ... now.

03 04 58 16 CMP No, I don't think the waste water dump ...  
particles?

03 04 58 20 LMP There it comes; there it comes, you guys!

03 04 58 23 CDR Oh, looky at that.

03 04 58 24 LMP Isn't that spectacular?

03 04 58 26 CDR Man, instant earthrise!

03 04 58 28 CMP Look at that guy creep up.

03 04 58 32 SC (Applause)

03 04 58 34 CMP I don't care if we got 10,000 - -

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03 04 58 35 CDR Hello there, Houston.

03 04 58 36 CMP -- we're going to have 10,001 ... of these  
(laughter) ... --

03 04 58 38 LMP Hurry, quick!

03 04 58 42 CDR Take it? Got to go to REACQ and you're at -  
high gain ... --

03 04 58 48 LMP No. No. ...

03 04 58 51 CMP Houston, 16.

03 04 59 02 CMP Beautiful.

03 04 59 06 LMP Want me to get them on omni first?

03 04 59 08 CMP Yeah.

03 04 59 10 CMP Houston, 16.

03 04 59 11 CDR We had S-band acquisition and S-band high gain.

03 04 59 15 LMP Yeah. Wrong page.

03 04 59 17 CMP Roger. Read you 5 by, Henry. We just got the  
10,000th picture of a beautiful earthrise.

03 04 59 22 LMP Ain't there yet. Over here.

03 04 59 31 CDR This is really some place.

03 04 59 35 CMP We had a chance to watch you get AOS that time.  
I know we got lots of pictures of it, but you're  
going to have to look at one more.

03 04 59 58 CMP That is - man, that is - -

03 05 00 00 LMP Isn't that beautiful?

03 05 00 02 CMP But you know, some of those photographs around the  
office that people say are - are no good, that  
looks the same color to me.

03 05 00 09 LMP Yeah. I don't think that photo fidelity's true.

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03 05 00 20 CMP Man (laughter) -

03 05 00 21 LMP ... how long before we get to ...

03 05 00 24 CMP About - 10 minutes.

03 05 00 28 LMP ... out the ...

03 05 00 29 CMP ... Yeah.

03 05 00 40 CMP Negative. We weren't trying to say anything, Hank. He probably didn't get our initial call.

03 05 00 51 LMP We just - can't find any words. Everybody's peeking out the window here. We got all the dumps completed and we're - all the dumps are secured.

03 05 01 13 CDR And I got some pictures of the back side of - -

## TIME SKIP

03 05 12 46 CMP Right down in there.

03 05 12 47 LMP You know, that SPS comes on a lot - -

03 05 12 48 CDR Right there?

03 05 12 49 LMP - - ... than I thought.

03 05 12 50 CMP ... Descartes.

03 05 12 51 LMP I thought it would be a big bang, but it's a slow buildup ...

03 05 12 56 CMP It won't be - the next one will be pretty slow, but the one you feel after that will be a surprise.

03 05 13 01 LMP I bet. PDI. We get a plane change on board, too, don't we?

03 05 13 10 CMP Yeah.

03 05 13 31 CMP Holy smoke. Oh. Here's an eat period. Filled with little things to do. Shh. Gosh.

TIME SKIP

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03 06 28 58 CMP Oh, man, if I could just get my sinuses to stay cleared!

03 06 29 06 LMP No way.

03 06 29 08 CMP I just - yours ought to clear out on the ground, don't they? It sure is a pain in the neck.

03 06 29 27 CMP Okay, nothing's hanging around the overheads anywhere that we've stuck out and we forgot to pick up? This burn occur in daylight or -

03 06 29 44 CDR No. Dark.

03 06 29 45 CMP Dark?

03 06 29 46 LMP Here's a map.

03 06 29 48 CMP Okay.

03 06 29 55 LMP Boy, we'd use a lot of gas: 20,000 pounds' worth of fuel ...

03 06 30 03 CDR Huh? We used a lot, huh?

03 06 30 07 LMP ... a lot.

03 06 30 08 CDR I hope so. Never get it out of lunar orbit unless you do. ... jettison.

03 06 30 18 CMP Some day someone's gonna explain to me why that was a rational decision, to not have a dump ...

03 06 30 35 CDR Rational, I think, decision, that's because we couldn't get the SPS to burn or RCS to burn.

03 06 30 52 CDR ...

03 06 31 43 CMP Coming up on 2 minutes.

03 06 31 46 CDR Roger.

03 06 31 47 CMP Two clocks that say it's 2 minutes.

03 06 32 03 CDR Right here's ...

03 06 32 05 CMP I don't - how you can get the - don't know how to put a bias in.

**CONFIDENTIAL**

03 06 32 08 CDR I don't either.

03 06 32 09 CMP With this kind of a burn - 20 seconds - it can't be more than a couple of tenths - -

03 06 32 13 CDR Yeah.

03 06 32 14 CMP - - plus the minute. So with a foot per second there - which might be significant -

03 06 32 19 CDR Yeah.

03 06 32 20 CMP I don't know how to do that.

03 06 32 36 CDR You got TRANS CONTROL POWER and all that stuff?

03 06 32 39 CMP Comes on at - a minute. Okay. Okay, going to NORMAL, TRANS CONTROL POWER, on. DELTA-V THRUST A, coming on, no light.

03 06 32 57 CMP MARK.

03 06 33 01 CDR Go ahead.

03 06 33 19 CMP Okay, average g is on. Okay, 18, 17, 16, ullage.

03 06 33 32 CDR You have it, Ken.

03 06 33 37 CMP Attitude's good.

03 06 33 39 CDR Nine, 8, 7, 6, 5, PRO, PRO, 3, 2, 1 -

03 06 33 46 CDR Zero.

03 06 33 47 LMP Okay, he's open.

03 06 33 48 CMP Okay.

03 06 33 49 LMP Okay, everything looks good. HELIUM VALVES are open. Pressures are great. Past the 10 seconds.

03 06 34 02 LMP Fifteen, 16, 17, 18, 19, 20, 21, 22, 23, 24 -

03 06 34 12 LMP Auto shutdown.

03 06 34 14 CMP I believe it was auto. Beautiful.

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03 06 34 16 LMP Twenty-four - about 24 ... - -

03 06 34 17 CMP Okay, copy these numbers.

03 06 34 21 CDR 0.8, 0.2 - -

03 06 34 22 CMP Okay, we had about - almost one of those before we started.

03 06 34 26 CDR 28, 210.6. Two, four balls, 8, and 210.6.

03 06 34 36 LMP ... 210.6. Okay, go ahead.

03 06 34 42 CMP/CDR Plus 0.8 - -

03 06 34 43 LMP Yeah.

03 06 34 44 CMP - - plus 0, plus 0.1.

03 06 34 47 LMP Okay. Go ahead.

03 06 34 49 CMP Okay, wait a minute now. That's - Okay, that's - We're not gonna trim. That's close enough.

03 06 34 53 LMP All right.

03 06 34 54 CMP Okay, let's look it up. VERB 6, NOUN 20, 1.21, 272.7 - Yeah. Yeah, 3.44. That's good.

03 06 35 12 CDR Got those numbers, Charlie?

03 06 35 15 LMP No, I don't have them.

03 06 35 16 CDR/CMP 1.21 -

03 06 35 18 CDR 272.7 - -

03 06 35 19 LMP Okay.

03 06 35 21 CDR - - 3.44.

03 06 35 24 LMP Okay, I'm ready on the gimbal motors.

03 06 35 25 CMP Okay, ... GIMBAL, MAIN B.

03 06 35 26 LMP Go.

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03 06 35 27 CMP One.  
03 06 35 28 LMP It's off.  
03 06 35 29 CMP Two.  
03 06 35 30 LMP OFF.  
03 06 35 31 CMP MAIN A.  
03 06 35 32 LMP Go ahead.  
03 06 35 33 CMP One.  
03 06 35 34 LMP Go ahead.  
03 06 35 35 CMP Two.  
03 06 35 36 LMP Both OFF.  
03 06 35 37 CMP SERVO POWERS are OFF.  
03 06 35 38 LMP Okay. BIT RATE, LOW.

## TIME SKIP

03 08 32 17 CDR ...?  
03 08 32 20 CMP PAN CAMERA, STANDBY; STEREO.  
03 08 32 32 LMP ...  
03 08 32 33 CMP And POWER. Let's see. The V/H OVERRIDE is not on.  
03 08 32 50 CMP MAPPING CAMERA, IMAGE MOTION is coming - ON -  
03 08 32 57 CMP MARK. Barber pole. And it's gray. IMAGE MOTION is ON.  
03 08 33 12 LMP ... keep talking ...?  
03 08 33 14 CMP Yes. ... that way if they get any unusual things in their signaling. Man, they sure need a timer over here. 38:01.

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03 08 33 30 CDR ...

03 08 33 31 CMP No, sir. I'll take care of that. Thank you. Do you need to get in here?

03 08 33 39 LMP Wanted to get a spoon is all.

03 08 33 42 CMP No (laughter). Thank you. That timer is only good for telling me to not forget something. Huh? Yeah. That was so I wouldn't get hung up and forget to do what I'm doing.

03 08 34 26 CDR ...

03 08 34 27 CMP Okay. Man, that's gonna ... a crick in my neck before this is over.

03 08 35 28 LMP Hey, you want some ... turkey?

03 08 35 30 CMP (Laughter)

03 08 37 04 CMP MAPPING CAMERA is coming ON -

03 08 37 07 CMP MARK. Then that goes - Well, let's see, I'll come back and catch the PAN CAMERA, OPERATE.

03 08 37 34 CMP Okay.

03 08 37 54 LMP Want me to take that stuff up for you, John?

03 08 38 05 CMP Talkback is gray. PAN CAMERA is operating. Holy smokes!

03 08 38 11 CDR What is it?

03 08 38 21 CMP Okay. MAIN B UNDERVOLT; turning the PAN CAMERA back to STANDBY.

03 08 38 27 CDR ...

03 08 38 29 LMP No.

03 08 38 31 CMP Okay, I'm ...

03 08 38 33 LMP Okay. That did it.

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03 08 38 34 CMP What's that?

03 08 38 35 LMP The mapping camera.

03 08 38 36 CMP Pan camera.

03 08 38 37 LMP Pan camera.

03 08 38 38 CMP Yeah. Okay. Okay. Let's see if I can reiterate what happened. As soon as I turned it on, we got an UNDERVOLT. Didn't happen to see how much it was?

03 08 38 57 LMP Yeah; 25-1/2.

03 08 39 00 CMP 25-1/2 volts?

03 08 39 04 LMP We're what? 26 - 27-1/2 now.

03 08 39 06 CDR Seven.

03 08 39 10 CMP That was MAIN B that gave us the UNDERVOLT?

03 08 39 12 LMP Yeah.

03 08 39 14 CMP Oh, darn.

03 08 39 16 LMP ...

03 08 39 47 CMP We still at 25-1/2, Charlie?

03 08 39 48 LMP Huh?

03 08 39 49 CMP 25-1/2?

03 08 39 50 LMP Yeah.

03 08 40 00 LMP ... about to eat the chocolate bar, huh?

03 08 40 10 CMP Mmm-hmm.

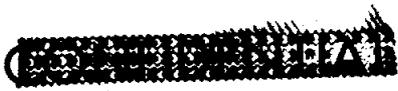
03 08 40 20 CMP We will for that one.

03 08 40 24 LMP You want to try it again, Ken, and let me watch it?

03 08 40 26 CMP No.

03 08 40 27 LMP ...

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03 08 40 31 CMP Oh, I don't really think there's any future in that.

---

03 08 40 44 CDR Make sure the ground doesn't want to try it either.

03 08 40 48 CMP ...

03 08 40 51 LMP ...

03 08 40 52 CMP Pan camera.

03 08 40 56 CDR Pan camera?

03 08 40 57 CMP Yep. Yeah, but the pan camera's on MAIN A.

03 08 41 07 CDR Well -

03 08 41 12 LMP ...

03 08 41 13 CMP Nope. Any conclusion they come to would be guessing anyhow. I suspect that MAIN B is running a little bit lower than MAIN A and they probably both got pulled down. You didn't happen to notice ...? I'm sure you didn't. I wouldn't have.

03 08 41 33 CDR No. All I saw was MA.

03 08 41 47 CMP Let's see. We're running 38 - almost 40 on fuel cell 3; 24 and 22. That's 32, 64 - 100 amps. That's a shame.

03 08 42 34 CMP MAIN BUS B UNDERVOLT; 27 volts? I don't understand that. Must have been a - -

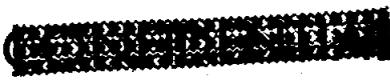
03 08 42 44 LMP Did you get another one?

03 08 42 45 CMP Yeah.

03 08 42 46 LMP Huh?

03 08 42 47 CMP Yeah.

03 08 42 48 CDR For what?



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03 08 42 49 CMP (Laughter) Well, John, I don't know what from. It's on 27 - 26-1/2 volts. MAIN A is on 27-1/2. Fuel cell 3 - -

03 08 42 58 CDR Fuel cells falling apart?

03 08 42 59 CMP No, I think they're running - normal. It's only pulling 37 amps. Now it's something - just cycle it up to 40 amps.

03 08 43 12 CDR What's ... fuel cell? Check ...?

03 08 43 15 CMP That's running about right. It must have been sitting right on the - I got some heater load on there. MAIN B. Those radiators couldn't be cycling, could they?

03 08 43 28 CDR ...

03 08 43 31 CMP No. What's the radiator outlet temperature? 25 - No, they're not on.

03 08 43 37 CDR ...

03 08 43 55 CMP Oh, shoot.

03 08 43 56 LMP We've got 28 volts now.

03 08 43 58 CMP Yep.

03 08 44 00 CDR What else did you shut off?

03 08 44 03 CMP Nothing. ...

03 08 44 15 CMP Well, we aren't running the thing.

03 08 44 19 LMP Check the - -

03 08 44 20 CMP Check the pressures on that.

03 08 44 21 LMP ...

03 08 44 24 CMP Yeah, they're getting a pretty good spread there.

03 08 44 40 CDR That's strange.

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03 08 44 49 CMP I think there's something wrong with that oxygen regulator. The flows in that thing are very unstable.

03 08 44 57 CDR Fuel cell 3?

03 08 44 58 LMP Yeah.

03 08 45 00 CMP Well - You know, I guess it really isn't bouncing that much more than the others. It's just that there's a bigger delta flow between the oxygen and the hydrogen here.

03 08 45 11 CDR Charlie, can you hand me my - my spoon out of my temporary stowage bag over there?

03 08 45 25 CMP Pressures all look normal?

03 08 45 27 LMP Regs look okay.

03 08 45 28 CMP Okay. Well, we've got high bit rate data on all this. They can take a look.

03 08 45 37 LMP Pressure's good.

03 08 45 57 LMP ... all right? Okay?

03 08 45 59 CMP Okay.

03 08 46 00 CDR CRYO 1 ... pressures are okay. Beats me ...

03 08 46 45 CMP MAPPING CAMERA coming to STANDBY - OFF. IMAGE MOTION is OFF. LASER ALTIMETER is OFF. MAPPING CAMERA - Got a barber pole on IMAGE MOTION, and the LASER is OFF. MAPPING CAMERA's going to RETRACT.

03 08 47 08 CDR Pan camera shouldn't have anything to do with it, should it?

03 08 47 11 CMP MARK. And a barber pole on the RETRACT, the MAPPING CAMERA.

03 08 47 18 CDR I thought that stuff was on MAIN B - -

03 08 47 20 CMP They're split.

03 08 47 21 CDR - - SERVICE MODULE/AC POWER?

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03 08 47 23 CMP Yeah?

03 08 47 24 CDR I mean SERVICE MODULE/AC POWER is off of MAIN B, because - -

03 08 47 28 CMP It's half and half.

03 08 47 29 CDR Is it half and half? Because - -

03 08 47 30 CMP (Laughter)

03 08 47 31 CDR Well, the reason I said so - the reason I thought it was - I mean - because I was reading the schematic somewhere and I thought you could lose - that they're in series and the fact that, if you lost this thing, it would cost you your B servo.

03 08 47 52 CMP Okay. I'm going to have to climb over where you are, John, for just a minute.

03 08 48 00 CDR Charlie, you need to shift.

03 08 48 03 LMP You want me to climb out of here? Where you want to go?

03 08 48 07 CDR I don't know. Ken's got to be over here, and he's got to be over there.

03 08 48 10 CMP Golly, there's some of those flows that go up the sides of walls.

03 08 48 15 LMP Okay.

03 08 48 16 CDR Get the pan camera ...

03 08 48 34 LMP Pan camera on now?

03 08 48 35 CMP No.

03 08 48 44 CMP Well, now. Guess who's got their X - next failure. A mapping camera that's out - to stay.

03 08 48 59 CMP (Laughter) I figured it would break, but I thought it would last more than one extension.

03 08 49 16 CMP There's 2 minutes and it hasn't come in.

03 08 49 19 CDR How long's it supposed to take?

**CONFIDENTIAL**

Day 4

~~CONFIDENTIAL~~

Page 191

03 08 49 21 CMP A minute and a half.

03 08 49 34 CMP Hey, John, can you - let me in there?

03 08 50 10 CMP Is that - barber pole still on the MAPPING CAMERA?

03 08 50 14 LMP No, Ken, it's back in.

03 08 50 15 CMP Back to gray?

03 08 50 16 LMP Yeah.

03 08 50 17 CMP Okay. It must have taken about - 3 minutes.

03 08 50 29 CMP Watch the stick. I got it activated.

03 08 51 31 CMP What's that 401 say? ...

03 08 51 39 LMP ...

03 08 54 14 CDR ... in here ...

03 08 54 23 CMP You brute. Gol-dang-it. That thing went in before.  
There we go.

03 08 54 29 CDR ...

03 08 54 49 CDR That ... like it should be?

03 08 55 51 CMP I thought I put ... Oh, no, I did.

03 08 55 56 CDR Okay. ...

03 08 56 00 CMP What's that?

03 08 56 01 CDR ...

03 08 56 02 CMP That'd never happen.

03 08 56 09 CDR You told me to put it back, so I did.

03 08 56 11 LMP It's right there.

03 08 56 15 CDR Ha! Would you believe ...?

03 08 56 17 LMP What?

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03 08 56 20 CDR ...

03 08 56 23 LMP How long are ...?

03 08 56 28 CDR I don't know. ... there. You only have ... then you gonna get that MAIN B UNDERVOLT coming out on the front side ...

03 08 56 40 LMP Right now.

03 08 57 00 CMP Gol-dang-it. Once again. Didn't give me any pan. Set the high gain at 0 and 170?

03 08 57 47 CMP You say you'd set your ...?

03 08 57 49 LMP ...

03 08 57 50 CMP Okay. That's MANUAL and WIDE.

03 08 57 52 LMP Okay.

03 08 58 00 CMP Okay. How about MAPPING CAMERA/LASER ALTIMETER COVER to CLOSE? Let's see, verify that that MAPPING CAMERA RETRACT barber pole is off and that the switch is in the RETRACT position.

03 08 58 17 LMP Yeah.

03 08 58 19 CMP Okay.

03 08 58 20 LMP MAPPING CAMERA/LASER ALTIMETER to CLOSE?

03 08 58 22 CMP Yes, sir.

03 08 58 23 LMP The COVER?

03 08 58 24 CMP Yep.

03 08 58 25 LMP CLOSE.

03 08 58 26 CMP Barber pole? Back to gray?

03 08 58 28 LMP Yeah. It was so fast I didn't ...

03 08 58 31 CMP Okay.

03 08 58 42 CMP When am I going to eat?

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03 08 56 48 LMP ...

03 08 58 49 CMP No, go ahead and finish your - -

03 08 58 50 CDR Tell me what you want - -

03 08 58 51 CMP - - finish your cleanup.

03 08 58 52 CDR - - and then I'll finish it up for you.

03 08 58 53 CMP No, go ahead and finish whatever you've got to do to get ready for tomorrow because the next thing I'm going to have to do is go to bed.

03 08 58 57 LMP ...

03 08 59 04 CMP Okay.

03 08 59 05 LMP ...

03 08 59 06 CMP Yeah.

03 08 59 11 CDR That's how we figured these - Where those water bags at, Charlie? We ought to fill those, right?

03 08 59 23 LMP ... exact ...

03 08 59 27 CDR Okay. Where are the ... - -

03 08 59 30 CMP Is this - -

03 08 59 31 LMP Back there towards the end - -

03 08 59 32 CMP - - is this John's chow?

03 08 59 33 LMP ...

03 08 59 34 CMP That's mine, too? In addition to this?

03 08 59 35 LMP No, no, wait a minute. ... Couldn't ... chicken stew.

03 08 59 39 CDR You want a wet pack? You sure?

03 08 59 41 CMP This.

03 08 59 42 CDR All right. That's mine.

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03 08 59 43 CMP That yours?

03 08 59 44 CDR ...

03 08 59 46 CMP Yeah.

03 09 00 00 CMP Oh, oh. Let me. Let me do some more things here. This ain't going to work (laughter).

03 09 00 12 CDR Yeah. Well, it's too old (laughter).

03 09 00 16 LMP This is downright dry!

03 09 00 18 CDR What do you want me to do?

03 09 00 19 CMP Well, I - -

03 09 00 20 CDR - - ... panel 230.

03 09 00 21 CMP There ain't no way to have an eat period in all this, isn't it?

03 09 00 24 CDR Looks like you can't have an eat period and see what's on the Flight Plan because you're gonna have ...

03 09 00 30 CMP Yeah. Except this is the first time to move the boom, and I'd like to move it. But I got to have the Flight Plan to see what time - Go ahead and finish your menu. No, it's on the other page.

03 09 00 51 CDR ...

03 09 00 53 CMP MASS SPEC and GAMMA RAY to DEPLOY. Okay. Go ahead. Finish your Flight Plan.

03 09 01 07 CMP Okay. There's a barber pole on the GAMMA RAY BOOM.

03 09 01 22 CMP And the MASS SPEC was running - 15 seconds after that one.

03 09 01 28 CDR ...

03 09 01 39 CMP Okay. Thank you, sir.

03 09 01 49 LMP Well, John, you want to put on the LTV - LCG ...?

**CONFIDENTIAL**

Day 4

~~CONFIDENTIAL~~

Page 195

03 09 01 53 CDR Yeah. After a bit - soon as I defecate. ...  
03 09 02 12 CMP Okay. ... 1, 2 -  
03 09 02 25 CMP Stir up.

TIME SKIP

03 10 31 39 CMP ... (laughter) ...  
03 10 31 46 SC (Sneeze)  
03 10 31 49 LMP ... wash your hands ...  
03 10 31 53 CMP Hey, you lick your fingers.  
03 10 31 59 SC ...  
03 10 32 01 CMP Yeah, if we could ... try it.  
03 10 32 25 CMP Looking out that window makes you think you're  
rotating instead of flying.  
03 10 32 27 LMP ...  
03 10 32 29 CMP ... going like this. Yeah. I keep looking back  
at the eight ball to see.  
03 10 32 42 LMP ...  
03 10 32 44 CMP No. No.  
03 10 33 23 CMP Oh! I didn't check that - that comm.  
03 10 34 00 CMP How about hitting TELCOM, GROUP 2, AC1?  
03 10 34 04 SC ...  
03 10 34 06 CMP Yeah.  
03 10 34 07 SC ...  
03 10 34 09 CMP ... telecom groups. ... balance buses.

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03 10 34 23 CMP Yeah. We're in the attitude I'll be in for -  
6 days. Yep.

03 10 34 34 SC ...

03 10 34 35 CMP Oh, yeah, you can turn it on and look the other  
way around. Even the real craters turn inside  
and out on me sometimes. ...

03 10 35 11 LMP ...

03 10 35 13 CMP No, but you may have some. (Laughter) The last  
thing I want you to do, Charlie, is to return the  
toothpaste.

03 10 35 23 SC (Laughter)

03 10 35 25 CMP You may have that - and my tissues - on a nonreturn  
basis.

03 10 35 44 CMP I'll get the tissues out if that's what you want.

03 10 35 55 CMP (Laughter)

03 10 36 14 CMP Get out of there, you son of a gun. Can you move?  
Get my - -

03 10 36 21 LMP ...

03 10 36 22 CMP Huh?

03 10 36 23 LMP ...

03 10 36 25 CMP Well, you said you wanted some tissues. They're  
right in there - right down under there. Yeah.

03 10 36 43 LMP ...

03 10 36 45 CMP Huh?

03 10 36 46 LMP ...

03 10 36 47 CMP I don't think so. I think they should be loose.  
(Laughter) Right - about where your hand is.

03 10 37 39 SC ...

03 10 38 01 LMP ...

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03 10 38 08 CMP Got your tissues and all that stuff? Okay. Now, are you going to defecate down there? Okay.

03 10 38 21 SC ...

03 10 38 22 CMP Well, I'll do my things after you get done. Well, I'm gonna change the canister, and chlorinate some water, and all that stuff. I'll do it later. Okay? Change the canister and all that crew-sleep bull.

03 10 38 44 SC ...

03 10 38 53 CMP Because it's interconnected with the waste water system.

03 10 38 57 SC ...

03 10 39 02 CMP Not when you - look to see where those vents go together. And those boats really do go upstream. They ain't smart enough to read those check-valve labels.

03 10 40 57 CMP ...

03 10 41 29 CMP Okay. We'll bump up the cabin and then get a little - master alarm.

03 10 41 42 SC ...

03 10 41 47 CMP If you think you're grungy, grimy, dirty now, wait until you get out on the surface, then go back in the LM. Man, I bet - I bet that LM looks like a disaster area.

03 10 42 20 LMP ...

03 10 42 29 CMP I suspect you're right. I suspect that - we got a - a sensor that's supersensitive, and when you put loads on it, it - probably triggers at the wrong level. But I ain't gonna run around and troubleshoot it.

03 10 43 19 CMP Well, let's see, I got to make sure - I got a pair of scissors left with me. Boy, you'd really be in deep trouble around here without your scissors. You got to make - we got to make sure that - There's some things on this transfer checklist that aren't

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**CONFIDENTIAL**

there. What I want to do is make sure you don't transfer two more pair of scissors to the LM.  
(Laughter) This is - -

03 10 43 51 SC ...

03 10 44 00 CMP I can't believe this place.

03 10 44 32 SC ...

03 10 44 36 CMP Yeah.

03 10 44 50 LMP ...

03 10 44 55 CMP No. In fact, you don't even have to put your headset on. Yeah. Yeah, if you don't want to do that, I'll plug into your hose, and let them correlate the data.

03 10 45 14 LMP ...

03 10 45 18 CMP I am.

03 10 46 04 CMP Charlie, did you fill out your menu?

03 10 46 06 LMP Yes.

03 10 46 07 CMP Okay. John, did you fill yours out?

03 10 46 12 CDR No.

03 10 46 13 CMP I'll fill it out for you if you'll tell me what you ate. Beef and gravy?

03 10 46 17 SC ...

03 10 46 22 CMP Huh? Chicken stew? Butterscotch? Chocolate bar?

03 10 46 27 CDR ...

03 10 46 31 CMP Chocolate pudding. Okay, I'll write that down.

03 10 46 34 SC ...

03 10 46 37 CMP (Laughter) What kind of tape did that bag have on it when you opened it? (Laughter)

03 10 46 44 SC ...

**CONFIDENTIAL**

Day 4

~~CONFIDENTIAL~~

Page 199

03 10 46 51 CMP (Laughter) You had a citrus beverage? How about gingerbread?

03 10 46 59 CDR ...

03 10 47 01 CMP Oh, man, you is a real hungry one.

03 10 47 37 CMP DIRECT O<sub>2</sub> is OFF.

03 10 48 08 LMP Adios, mother.

03 10 48 12 CMP Gosh.

03 10 48 21 SC ...

03 10 53 21 CMP The tissues? They're right here. Here you go. Turn around. Ohh. Darn umbilicals! I hate these things.

03 10 55 29 CMP Yeah.

03 10 57 02 SC ...

03 10 57 04 CMP (Laughter) They'll never publish it. (Laughter)

03 10 57 07 SC ...

03 10 57 12 CMP (Laughter)

03 10 57 23 CMP That's right.

03 10 57 27 SC ...

03 10 57 35 LMP ...

03 10 57 41 CDR ...

03 10 57 50 CMP (Laughter)

03 10 57 55 SC ...

03 10 58 04 CMP How did you guys decide who was the owner?

03 10 58 12 SC ...

03 10 58 14 CMP (Laughter)

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03 10 58 16 SC ...

03 10 58 30 CMP (Laughter) Well, you - -

03 10 58 35 SC ...

03 10 58 39 CMP Well, you know, you come equipped with one.

03 10 58 46 SC ...

03 10 59 00 CDR What for?

03 10 59 02 LMP ...

03 11 00 46 CMP Huh? In 5 to 10 minutes.

03 11 00 51 SC ...

03 11 00 52 CMP Five to 10 minutes.

03 11 00 54 SC ...

03 11 00 55 CMP (Laughter) How about some water? It's chocolate pudding when you get through. (Laughter)

03 11 01 00 SC ...

03 11 01 12 CMP Is it what? Yeah, we're AOS now. Yeah.

03 11 01 28 CMP AOS? Quite a while, I hope.

03 11 01 38 SC ...

03 11 01 39 CMP Yeah.

03 11 03 34 SC ...

03 11 03 39 CMP It says do that in the morning.

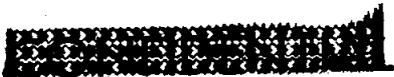
03 11 03 41 SC ...

03 11 03 50 CMP Hey, do you want me to fill them for you?

03 11 03 54 LMP ...

03 11 03 57 CMP Where are they, Charlie?

**CONFIDENTIAL**



03 11 03 58 LMP ...  
03 11 03 59 CMP Okay. I'll fill them. How much goes in them?  
03 11 04 01 LMP ...  
03 11 04 03 CMP Oh, you're kidding. Okay. I'll do that right now.  
03 11 04 27 LMP ...  
03 11 04 48 CMP Oh.  
03 11 05 38 SC ...  
03 11 06 40 CMP Okay, you decided you wanted to fill those drink bags, John?  
03 11 06 47 CDR ...  
03 11 06 52 LMP ... start? ...  
03 11 07 15 LMP Okay, pull the thing apart ...  
03 11 07 57 CMP John, you want me to fill these? Well, it looks like this high gain isn't working.

TIME SKIP

03 19 35 43 CDR Okay. I did that last night.  
03 19 36 02 CMP ... on that thing.  
03 19 36 27 CMP Here you go.  
03 19 36 29 LMP Want to change with me now?  
03 19 37 14 SC ...  
03 19 37 54 CDR ...  
03 19 37 56 CMP Share the drink.  
03 19 37 58 CDR ...  
03 19 38 04 LMP Okay. I'm not gonna make you drink it.



**CONFIDENTIAL**

03 19 38 10 CMP You want yours, Charlie?  
03 19 38 12 LMP ...  
03 19 38 14 CMP There you are.  
03 19 38 19 CDR I got a ...  
03 19 38 22 CMP Okay.  
03 19 38 38 CDR ... to the ... very cold.  
03 19 39 00 CDR Okay, we're eating.  
03 19 39 03 CMP Okay, have you got all the - got all the bags filled with tools and all that stuff?  
03 19 39 14 CDR Yeah, we're - -  
03 19 39 16 CMP You got the pills down there, Charlie?  
03 19 39 18 LMP Sure. ... right there.

## TIME SKIP

03 21 54 31 CMP We're through with the LM umbilicals, I hope.  
03 21 54 45 CMP There's a lot of ... up here.  
03 21 55 01 CMP I think it's almost as easy to ... it was designed ... Yes, sir. I'm gonna count them ... at least a dozen ... Yeah. I'll stow them.  
03 21 55 23 CMP Yeah. We don't want to - we don't want to leave these up here. ... get in the way.  
03 21 55 49 CMP Huh? What?  
03 21 56 06 CMP Yeah, we're - The only way we'll keep from screwing up is to follow the checklist. Which comes after - comes after the tunnel. Wait a minute. After what? No, sir. I got a coarse align that comes 40 minutes after probe and drogue. If I get out of sync, I'm going to make you run the ... Well, you're way ahead of your time line, and I'm just barely hanging on.

**CONFIDENTIAL**

Day 4

~~CONFIDENTIAL~~

Page 203

03 21 58 21 CMP Putting all this stuff in here. Trying to put the food on and then do ... food ...

03 21 58 51 CMP Okay. Let's start on the business. You say put the probe in, huh? I'll probe and drogue ... probe and drogue ...

03 21 59 52 CMP Yeah. Okay.

03 22 00 32 CMP Holy smoke!

03 22 01 19 CMP Okay. You got the - you got some - three capture latches in there? All righty.

03 22 01 38 CMP Last chance to swap seats, Charlie. I got my LCG all ready.

TIME SKIP

03 22 21 59 CDR Ken, are we pretty close to being at the undocking attitude?

03 22 22 02 CMP Undocking attitude is 01 plus 40.

03 22 22 15 CDR Okay.

TIME SKIP

03 23 23 35 LMP Ken, you can go FREE.

03 23 28 41 CMP Okay. I'm FREE now.

03 23 28 46 LMP All right.

03 23 29 11 CDR I believe you're moving them.

03 23 29 15 LMP Yeah. It feels like it.

03 23 31 37 LMP Okay. Ken, you can go wide dead band, att hold.

03 23 31 42 CMP Okay. We're in att hold.

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**CONFIDENTIAL**

03 23 31 55 CMP How about if we set up this comm configuration to record data, and then I can work on the hatch.

03 23 31 58 LMP Okay, I'll do it. Okay, you got it - B DATA.

03 23 32 30 CMP Okay, Orion. I'm going to turn my roll engines off because it looks like we're stable here, and go ahead with the procedure here, and close out the tunnel.

03 23 32 39 LMP Okay.

03 23 33 43 LMP Say, Ken. Can you turn the B3 off, please? We're going to do a rendezvous radar checkout.

03 23 33 46 CMP Yes, sir. It's been off.

03 23 33 47 LMP Thank you. And verify your transponder off.

03 23 33 54 CMP That's verified.

03 23 41 02 LMP Okay, Ken, you can turn on B3 and the transponder, as you would.

03 23 41 12 CMP Okay. And I'll - I'll put the hatch in.

03 23 41 38 CMP Okay. If you'll verify that your hatch is closed and dump valve in AUTO.

03 23 41 48 CDR That's verified, Ken.

03 23 41 50 CMP All right, sir.

03 23 44 59 CMP And, Orion, I understand you're complete with your rendezvous radar transponder check. ... Is that affirm?

03 23 45 07 LMP That's affirm, Ken.

03 23 46 06 CMP No good way to get to that ...

03 23 48 18 LMP Say, Ken, is the tunnel vented yet?

03 23 48 21 CMP It's venting.

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03 23 48 23 LMP Okay. We're ready for our regulator check right now, when you get a - if you'll give us a go on that tunnel vent.

03 23 48 29 CMP Okay, I've got about a half of a psi to go before I get - let you have it.

03 23 48 35 LMP Okay.

03 23 50 57 CMP Okay, I've got us about 22-1/2 minutes from undocking, and I'm at 3-psi DELTA-P in the tunnel. Estimate another ... to get it ... down.

03 23 51 13 CDR Okay, Ken, that's fine.

03 23 51 21 CMP You guys don't have any problems over there?

03 23 51 23 CDR Yeah, we can't get our COMPUTER ACTIVITY light to go out.

03 23 51 35 CMP Well, that's a busy little thing anyway. Nothing in the - we do not undock before we get AOS?

03 23 51 48 LMP Oh, no. We're ready to go.

03 23 51 50 CMP Okay.

03 23 51 51 LMP Just don't have your state vector in and that's the prob - that's our problem - it's not - it's having trouble bringing state vector up.

03 23 51 56 CDR ... \*\*\*

03 23 51 59 CMP Okay.

03 23 52 36 CMP Okay, I'm doing a routine check on the tunnel. As soon as I complete this, you can go ahead and do your relief valve check.

03 23 52 47 LMP Okay.

03 23 52 49 CMP I'll wait - I'll make this a 1-minute check.

03 23 54 07 CMP Okay, I'm back in tunnel vent and I'm gonna bring my roll engines on, and you're clear to check your relief valve.

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03 23 54 17 CDR

Okay.

03 23 54 18 LMP

Okay.

03 23 56 45 CMP

Okay, Orion. I'm going to maneuver to the undocking attitude.

03 23 56 49 CDR

Okay, go to it.

**CONFIDENTIAL**

## DAY 5

04 00 01 35 CDR Okay, Ken. Are you in undocking attitude now?

04 00 01 38 CMP That's affirmative; 12 minutes.

04 00 01 41 CDR Okay. Okay, Ken. Give me a VERB 06 NOUN 20 on my mark.

04 00 01 54 CMP Stand by.

04 00 02 03 CMP Okay, say when.

04 00 02 05 CDR Three, 2, 1 -

04 00 02 07 CDR MARK.

04 00 02 09 CMP Okay. ... Let's do it again.

04 00 02 18 CDR VERB 06 NOUN 20; 3, 2, 1 -

04 00 02 22 CDR MARK.

04 00 02 24 CMP Okay. Plus 000.04; plus 105.56; plus 000.45.

04 00 02 40 CDR Okay, that was at 96:02:23, Charlie.

04 00 02 43 LMP Yeah - -

04 00 02 44 CDR Read the numbers again, Ken.

04 00 02 46 CMP Plus 000.04; plus 105.56; plus 000.45.

04 00 02 59 LMP Okay. Copy four balls 4, 105.56, three balls 45.

04 00 03 04 CMP That's affirmative.

04 00 04 09 CMP Okay. And let me make a small trim maneuver. Looks like it should be less than a half degree, unless you'd like to just leave it alone. Either way.

04 00 04 26 CDR It's up to you.

04 00 04 33 CMP Okay, let's leave it as is.

04 00 09 34 CDR Okay, Ken. How much to undocking?

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04 00 09 37 CMP Three minutes and a half.

04 00 09 40 CDR Okay. It's gonna undock at 96:13 even?

04 00 09 44 CMP 96:13:31.

04 00 09 46 CDR Okay.

04 00 09 52 LMP \*\*\* ... I can't.

04 00 12 24 CMP Okay, can you read me on VOX, Orion?

04 00 12 35 CMP Orion, do you read on VOX?

04 00 12 40 LMP We're reading you 5 by.

04 00 12 41 CMP Okay. We're inside of a minute. Understand you're still GO.

04 00 12 51 LMP \*\*\* ...

04 00 12 56 CMP Okay, if you're on VOX, you're cutting out pretty badly, too. Thirty seconds.

04 00 13 02 CDR \*\*\* VOX, Ken. Okay, go ahead and undock whenever you want to, and then go ahead and separate.

04 00 13 08 CMP Okay.

04 00 13 21 CMP Okay, coming up. Give you a countdown for the release; 5, 4, 3, 2, 1 -

04 00 13 33 CMP RELEASE. We didn't go very far. (Laughter)  
Okay. We'll let it sit here for a second. Okay, we're going to back off, now.

04 00 15 56 CMP What more can you ask for?

04 00 16 03 LMP Ken, you can - you can see your RCS spitting at us.

04 00 16 11 CMP Yeah, yours is doing the same.

TIME SKIP

**CONFIDENTIAL**

04 00 41 19 LMP

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Okay, now, Jim. That was a little bit too fast but I think I got it all. 098:47:00.00; plus 0102.3, plus all balls, minus 0050.0; 0138.0; plus 0011.0, 0113.9; 0:35, all balls, 273; 5927.0; 0127.60, plus all balls, minus 0049.4; 099:35 all balls; 101:22:15.00. LM - that's throttle profile is 10 percent for 26 seconds in full throttle. LM weight, 36673. Go ahead.

04 00 42 17 CDR

Okay, and I'm going into the landing radar check again. You have it.

04 00 42 26 LMP

Okay, read that again, Jim. The - the DELTA-V<sub>X</sub>.

04 00 42 39 CMP

Apparently you need some breakers ... I keep looking for your ... if you can't ... here, take it out ... Things I'm looking at now are really not that far from - -

04 00 42 53 LMP

Okay, I was wrong on that. I got it now, 0102.6. And go ahead with the PDI pad. You speak.

04 00 43 43 LMP

Roger, Jim. Could we start a pitch attitude down to see the landing site?

04 00 43 51 CMP

Thank you, sir.

04 00 43 53 CDR

Are you done with our E-MOD, Jim?

04 00 44 05 LMP

Okay - -

04 00 44 06 CDR

I didn't think you were.

04 00 44 07 LMP

Okay, fine. I'm - I'm down through Kilo, and I'll read back starting at India. 098:35:04.68; 11:04, plus 0002.6; 002, 114, 340; plus 56997; 101:22:15.00; 103:21:00.00. Over.

04 00 44 40 LMP

Go ahead.

04 00 45 14 LMP

It is in AUDIO. Okay, and reading back starting with Lima, 098:59:29.03; 105:19:45.00; November, 100:42:42.86. Go ahead with the next one. Over.

04 00 45 51 LMP

Okay, go ahead with the AGS.

04 00 46 15 LMP

Okay, copy 9 - 90, 00, 00111.

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Day 5

04 00 46 27 CDR Okay - okay, there's the data. It's reading all right in H-dot, but it's changing data in - in the next two registers. And the tapemeter's not - and the tapemeter's now reading 480 opening, and the altitude meter, which first time I did it read 8000, and it's now reading zero.

04 00 47 05 CMP Okay, we checked that one very nicely. Very easy to identify the optics and very ... AUTO OPTICS - -

04 00 47 15 LMP Roger.

04 00 47 16 CMP - - ... - just a little bit -

04 00 47 22 LMP Jim, I don't think it's tracking in yaw.

04 00 47 28 CMP AUTO OPTICS leads the target about a kilometer out into the Cayley Formation.

04 00 47 48 CDR Roger. You can see the data.

04 00 48 05 LMP Roger.

04 00 48 16 LMP Okay, you have it.

04 00 48 22 CDR Okay, I'm going to terminate the landing radar test, if that's okay with y'all.

04 00 48 42 CMP Orion, Casper. Are you ready for rendezvous radar and VHF range check?

04 00 48 48 CDR That's negative; Houston wants them to stay locked on right now.

04 00 48 51 CMP Okay.

TIME SKIP

04 01 22 22 CDR Okay. And, Jim, I saw the landing site as we passed over it. We're not going to have any trouble recognizing it from the rays. The rays stand out beautifully.

04 01 23 10 CDR Ken, how do you read? Over.

04 01 23 13 CMP Loud and clear. How me?

**CONFIDENTIAL**

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Day 5

04 01 23 21 CDR Ken, do you read us on VHF? Over.

04 01 23 26 CMP Yes, loud and clear.

04 01 23 29 CDR You fixing to do the burn, right?

04 01 23 31 CMP Sure am.

04 01 23 33 CDR Okay; when you finish the burn, we'd like to get a radar check.

04 01 23 39 CMP Okay. I'll see what I can do.

04 01 23 43 CDR \*\*\* to do it. We'll do a P76 after you finish your VERB and - and a VERB 83 and get a radar lock, if that'll be all right.

04 01 23 55 CMP Okay. Let's see how much I have to do.

04 01 23 58 CDR Okay.

04 01 31 50 CMP ... buses are ... AUTO, ... MAIN A ... AUTO ... AC2 ... OFF, ... BMAGs to 1 ATT, SPACECRAFT CONTROLLER to SCS.

04 01 32 19 CMP ... marked. ...

04 01 33 12 CMP ... yaw ...

04 01 33 31 CMP ...

04 01 33 43 CMP It's not gonna work.

04 01 34 26 CMP I be a sorry bird.

04 01 35 01 CMP Hey, Orion?

04 01 35 07 CDR Go ahead, Ken.

04 01 35 10 CMP I have an unstable yaw gimbal number 2. It's just been oscillating and - oscillates in - yaw any time it gets excited.

04 01 35 25 CDR Oh, boy.

04 01 35 26 CMP You got any quick ideas?

04 01 35 33 CDR No, I sure don't.

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04 01 35 41 LMP What does your \*\*\*\*?

04 01 35 43 CMP This thing says I have to have four servo loops to do the circ. Every time I put number 2 servo on, it's okay until I disturb it, and then it starts to oscillate. And you can feel the spacecraft shaking. It's really doing it.

04 01 36 00 CDR Okay. You have to have four loops to do circ, huh?

04 01 36 12 CMP That's what it says. It's unstable in all SCS modes on secondary servo. ... I can't believe it, but I'm watching it. Every time I select the secondary yaw gimbal, any excursion in the thumb-wheel causes it to go unstable.

04 01 36 41 CDR Well, just hold what you got, then.

04 01 36 44 LMP Hey, Ken, why don't you just stop it and then start it again?

04 01 36 47 CMP I've done that twice.

04 01 36 54 CDR Let us get pointed at you and do a VERB 83.

04 01 37 03 CMP Okay, gang. I'm sure sorry about this, but that number 2 servo is just oscillating like a wild man.

04 01 37 10 CDR Yeah.

04 01 37 12 CMP And I tried it both in MANUAL and TVC and in the - in the - just with the thumbwheel, and I get the same response. There could be a switch here somewhere but I - I swear I've checked them all, all I can. I guess I'll power them down.

04 01 37 32 CDR Tell the ground when you go around.

04 01 37 35 CMP Okay. Brother, what a way to start the day, huh?

04 01 37 46 CMP Do you suppose there's any - Let me try terminating 509 and see if that would help maybe. No, it was in SCS. That shouldn't have any effect. I wonder if we got that relay stuck in there some way.

04 01 38 00 CDR The TVC enable relay?

**CONFIDENTIAL**

Day 5

Page 213

04 01 38 02 CMP Yeah. I'm gonna try my gimbal drive check anyhow - in the G&N.

04 01 38 42 CMP ... no good in TVC either - in my gimbal drive check. I'm gonna back out here and power down.

04 01 38 57 CDR Okay. Okay, Ken - -

04 01 39 04 CMP \*\*\* 2's OFF; PITCH 2's OFF. YAW 1's OFF; PITCH 1's OFF. Servos 1 and 2 are off. Going back to POO.

04 01 39 44 CMP BUS TIES are coming OFF; 1; 2's OFF.

04 01 40 27 LMP Hey, Ken, is it both gimbals oscillate like that?

04 01 40 30 CMP No, the number 2; and my burn rules say I got to have two sets of servo loops - two on each; got to have all four servo loops to go.

04 01 40 39 CDR \*\*\* Ken.

04 01 40 40 CMP I'm sorry, gang. I don't know what to do with the darn thing. It does it both when the CMC drives it and when we drive it. I've started it, re-started it, and it's just apparently really in the servo loop.

04 01 41 12 CDR Do you get there before we do, or do we get there before you do?

04 01 41 17 CMP I don't know; it's probably a very close race. Yeah. ... In fact, I guess the next thing we've got to do is make sure we don't hit.

04 01 41 26 CDR I'll work on that.

04 01 41 28 CMP Okay.

04 01 43 45 CMP Yeah, I show us at - 0.8 miles ...

04 01 43 53 CDR You got a lockup?

04 01 43 55 LMP We got a visual on you.

04 01 43 56 CMP You have?

04 01 43 57 LMP Yes, sir.

~~CONFIDENTIAL~~

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04 01 43 59 CMP Okay.

04 01 44 14 CMP Which way am I pointing compared to you - should be about 180 degrees away.

04 01 44 23 LMP All we can - -

04 01 44 26 CDR There's no way to tell, T. K.

04 01 44 27 LMP Oh, okay; I just thought maybe - All we see is your thruster firing.

04 01 44 38 CMP Okay, I got ...

04 01 45 29 CDR Okay, Ken. We're gonna lock up the radar on you.

04 01 45 33 CMP Okay; I'm probably going to have to maneuver it so you can get a ... lockup, where I am ...

04 01 45 40 CDR Well, we'll get ready to go anyway. You're not very far away. We'll see.

04 01 47 18 CDR Okay, Ken. We must be out of your field of view.

04 01 47 23 CMP Okay. I don't want to call P20 because I'm not sure how it would interact with all this other stuff. So I'm gonna try another way of finding you. I'm gonna start a little pitch around. I'll pick you up and catch you later.

04 01 47 36 CDR \*\*\* Charlie.

04 01 50 09 CDR We've had sunrise, and the Sun is behind us.

04 01 50 12 CMP I got an unusually bright star. I bet that's you. I'm almost pointing at you, if that's the case. I don't - That couldn't be. Must be a planet.

04 01 50 26 LMP We got our tracking light on.

04 01 50 33 CDR You ought to be right in the sunrise.

04 01 50 38 CMP Well, I guess you're a little ahead of me. You may get AOS first.

04 01 51 17 CDR Is your transponder working?

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Page 215

Day 5

04 01 51 20 CMP Well, it self-checked okay. I don't show anything on the AGC yet. Power's on. It should work.

04 01 52 16 CMP You're looking down-Sun at me, right? Is that right, John? You're looking down-Sun at me?

04 01 52 28 CDR That's affirmative.

04 01 52 29 CMP Okay. I'm coming into the Sun, so I guess I must be coming closer to you.

04 01 53 12 CDR We're pointed right at you, Ken.

04 01 53 15 CMP Okay.

04 01 53 27 CMP I'm passing through the Sun right now.

04 01 54 14 CDR You ought to be looking right at \*\*\*

04 01 54 18 CMP Well, what I'm looking at right now is the Sun. Seen my attitude yet?

04 01 54 29 CDR No, I can't. I can't see you at all. All I see is the light.

04 01 54 34 CMP Okay. If you have your tracking light on, you can turn it off before you burn it out. Maybe they can figure out some way to make it useful yet.

04 01 54 41 CDR Okay, we got signal strength.

04 01 54 47 CMP Roger. I show you locking up.

04 01 56 52 CMP Did it look like I was going over the top of you, John?

04 01 56 58 CDR Yeah, I believe so.

04 01 57 00 LMP Yeah, you are.

04 01 58 14 CDR Okay. We're terminating this rendezvous radar test, Ken. We're gonna go to PDI attitude.

04 01 58 23 CMP Okay; I don't have a visual on you yet, John.

04 01 58 28 CDR Okay. Well, we're out in front of you, and we're - -

04 01 58 33 CMP You're out in front?

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**CONFIDENTIAL**

04 01 58 35 CDR That's affirmative. We're ahead of you. No. Dadgummit.

04 01 58 41 CMP I don't see how that could be.

04 01 58 47 CDR We're - we're upside down and the Sun is over our shoulder, and we're looking back at you. And I promise that's the case.

04 01 59 00 CMP I guess my nav system isn't very good.

04 01 59 03 LMP Okay, Ken. Let's just forget this. I think you went down below us, and we're gonna go to PDI attitude, and why don't you go to your comm attitude.

04 01 59 11 CMP Okay. What I'm trying to do is to keep \*\*\* I'd like to get a \*\*\*

04 01 59 21 CDR Well.

04 02 00 12 CMP My computer ...

04 02 01 08 CMP Can you put me against the sky ...?

04 02 01 11 CDR You're against the sky, about 5 degrees up - 6 degrees up.

04 02 01 55 CMP I've got you. You were ...

04 02 02 01 CDR We are, huh?

04 02 02 03 CMP I think we're about a half ...

04 02 02 05 CDR \*\*\* that's all I know.

04 02 02 08 CMP Well, ...

04 02 02 12 CDR I think you're right.

04 02 03 33 CMP Looks to me ...

04 02 03 48 CMP ...

04 02 03 51 CDR Yeah, we do.

04 02 03 52 CMP Okay, you want me to try and stationkeep ...

**CONFIDENTIAL**

Day 5

~~CONFIDENTIAL~~

Page 217

04 02 03 57 CDR Say again?

04 02 03 59 CMP Would you rather I stationkeep, or just let it drift?

04 02 04 06 CDR I wouldn't worry about it right now, Ken; we got to get ahold of the ground and see what they want to do.

04 02 04 11 CMP I was just wondering if ...

04 02 04 30 CMP I guess we aren't going to be that far apart ...

04 02 04 36 CDR I don't think so.

04 02 04 42 CMP ...

04 02 04 51 CDR 98:10.

04 02 09 11 LMP Hey, Ken. The G&N won't do the gimbal drive right either?

04 02 09 16 CMP ... goes unstable ...

04 02 09 59 CMP ... pretty convinced that it's got to be ...

04 02 10 13 CDR I don't think a switch can do that to you.

04 02 10 16 CMP I - I'd like to ...

04 02 10 20 CDR Did you try both sets of AC1 and AC2 on it?

04 02 10 23 CMP Yes, sir.

04 02 10 25 CDR Yeah, I figured.

04 02 10 45 LMP Okay, Ken, we're getting earthrise.

04 02 10 47 CMP Yeah, I got my high gain set up.

04 02 11 14 CMP I think they locked up on me. Hello, Houston. This is Casper Bar [?] now. We did not do circ, and I'd like to talk about the TVC servo loop.

04 02 11 32 CMP That's affirmative. Presently about a mile ahead of the LM. And I'd like to talk about a TVC servo loop problem.

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04 02 11 54 CMP

Okay; and - and break in and tell me as soon as you get the DS - get ready to dump the DSE, so you can take a look at what I'm talking about, and I'll leave the antenna MANUAL and WIDE so you can. Okay; the text is that we came up to the burn time and I was going through the gimbal checks. Number 1 servo started normally, checked out. I switched to - clockwise on the THC to perform the secondary gimbal check and started them. They looked normal. I set the pitch trim normally, and I went to set the yaw trim. I've just been checking to see if the lock worked, and I got divergent oscillations on the yaw trim indicator, and you could feel them in the spacecraft. So I switched to the - SERVO POWER to the number 2 SERVO to AC1/MAIN A, tried that. That had no effect. Then I cycled through looking at - at the gimbal - with the AUTO ... switch in number 1, number 2 in AUTO. Every time I selected number 2, by some means, I had the same results. Then I tried SCS in AUTO, and as soon as I would excite some motion in the secondary yaw servo, why, it would go unstable again. I then tried using the G&N to drive the gimbal, and I did the first half of the gimbal drive in servo loop 1, then switched to the servo loop 2 for the second half, and again the same instability showed up. Based on the rule of four servo loops, I canceled circ. I had no other indications in the cockpit, no warning lights, no - no other abnormalities. The ... was, in fact, running, but I don't think that could have had any effect when SCS was going.

04 02 14 19 CMP

Yes, sir. Will do. How about if I just give you the high gain from right here?

04 02 14 55 CDR

Roger. That's what you have, FORWARD omni.

TIME SKIP

04 03 16 32 CDR

... the CSM to be active ... They want ... Oh, this one must be - Yeah, this is RCS ... - -

04 03 16 44 CMP

Okay.

**CONFIDENTIAL**

04 03 16 46 CDR Yeah, they - yeah, but they must want the CSM to be active on the ... What is the ...? ... go down there ... Can't ... these burns. ... it's very expensive to try to keep ...

04 03 17 18 LMP Okay, Ken. We're gonna lock on to the landing rad - to the rendezvous radar, and are you just gonna move in with RCS?

04 03 17 26 CMP Yeah. I think I'll ...

04 03 17 31 LMP You're pretty garbled.

04 03 17 34 CMP ... Can you read me now, Charlie?

04 03 17 38 LMP Yeah, we - we read you.

04 03 17 40 CDR You sound like you're talking through about 6 feet of grits.

04 03 17 47 CMP I don't think that's what it is right now.

04 03 17 53 CDR That's ... all that stuff? Oh, man. ...

04 03 18 33 CDR Makes you think that the ... valve ... ... landing radar, Ken. Pick me up ...

04 03 19 06 CDR Look at that.

04 03 19 08 LMP What?

04 03 19 09 CDR Already lost some of it.

04 03 19 13 LMP This was pretty good flight.

04 03 19 17 CDR Going down.

04 03 19 32 LMP Got time for this ...? It has - it's got a main ... minus something.

04 03 19 47 CDR Well, it will be here pretty quick, Charlie. ...

04 03 20 07 CDR That's 20 minutes. I don't think we'll ever agree on that, though; okay?

04 03 20 13 LMP Okay. Let's try ...

04 03 20 16 CDR Okay.

**CONFIDENTIAL**

04 03 20 38 CDR ... there and ...

04 03 21 06 CMP Okay, ... lock up on the radar ... Okay, Charlie.

04 03 21 12 LMP We're not locking up. We're gonna say that we don't want to do it for this, Ken.

04 03 21 18 CMP ... plans.

04 03 21 25 CDR Okay.

04 03 22 22 CMP ... flight ...

04 03 22 34 CMP ... oh, okay ... try to ...

04 03 22 55 CMP I didn't get a chance to follow all the things ... Do you have any problems or anything?

04 03 23 01 LMP We got a RCS problem, but it's not too bad. Otherwise, we're okay. We can't get our steerable antenna up.

04 03 23 21 CMP You don't need that now, do you?

04 03 23 22 LMP No.

04 03 23 23 CMP ... go down on omni?

04 03 23 24 LMP Yeah. We can land on omni. How's does that thing look to you, Ken? Is it unstable everywhere?

04 03 23 30 CMP Yes, sir. There's no question about it. I - any - any force at all that moves at all makes it go unstable. Looks like feedback in the control.

04 03 23 40 LMP Is that main B? Is it run off main B?

04 03 23 44 CMP Yeah. But I don't think that - it's not likely that I wouldn't have done that, I wouldn't think. They - they told me after - I guess it was after you guys had left that they went back and looked at the dumps and found that we happened to hit all the heaters at one time.

04 03 24 00 LMP Ah so. Well, I never did think it was a good idea to run those gimbal motors that long.

**CONFIDENTIAL**

04 03 24 13 CMP Well, I guess they're having some of those kind of thoughts right now, too.

04 03 24 20 LMP Those once-in-a-million problems like that coarse align, ... boresighted on it.

04 03 24 33 CMP Well, I guess we really need to wait and see ... really want. You never know, those guys might come through here and find a way to take you down. Thought that it would hold its position with an external force on it, we could control the problem pretty good by using the - just using the proper trims to start the burn.

04 03 24 59 LMP Yeah.

04 03 25 01 CMP But if you just count on the external forces not moving it, then I don't know what you do. I was thinking maybe we could use it in ACCEL COMMAND with - just set the proper trim and immediately go to SCS and ACCEL COMMAND, point it the right direction.

04 03 26 27 LMP Was I sleeping? I was almost asleep.

04 03 26 37 CDR ... beside herself.

04 03 26 41 LMP Yeah.

04 03 27 12 LMP Well, we'll be ...

04 03 27 17 CDR \*\*\* right.

04 03 27 28 CDR We ain't gonna do any EVA today, either.

04 03 27 30 LMP You don't want to?

04 03 27 32 CDR Not for two revs, Charlie. ... tomorrow ... full thing.

04 03 27 55 CDR ... bend?

04 03 27 59 LMP Probably the first dish, yeah.

04 03 28 34 LMP He's dropping down out of bottom of the window.

04 03 28 54 CMP We're now passing right ... through Scorpio.

**CONFIDENTIAL**

04 03 28 58 CDR Yep.

04 03 29 00 CMP Did find out that once we got the LM off there that the - we'd be able to see it a lot better. I guess the telescope just wiped out the ... the LM.

04 03 29 39 CMP What's the limitation of how long you can stay before - you can't go down?

04 03 29 44 CDR Five revs.

04 03 29 46 CMP No, I mean what's the limiting factor? Is it water?

04 03 29 49 CDR No. We got plenty of water.

04 03 29 51 LMP We could - we can land and just do a couple of EVAs.

04 03 29 56 CMP I just wondered what - how they came up with five revs - was it water or what ...?

04 03 30 02 CDR Got no idea.

04 03 30 03 LMP I don't know.

04 03 30 12 LMP Light still on?

04 03 30 15 CDR Yeah, ours is.

04 03 30 16 LMP No, I mean the RCS light.

04 03 30 26 CDR ... pressure?

04 03 30 29 LMP ... 10.

04 03 30 47 LMP I think we got enough ullage in there, in the tanks to -

04 03 30 55 CDR Just let it go? It's not firing?

04 03 31 01 LMP Well, I don't know.

04 03 31 13 LMP I don't think we ought to fire anymore.

04 03 31 32 LMP It's probably that thermal blanket blew off and caused this thing to overpressurize.

**CONFIDENTIAL**

Day 5

04 03 31 39 CDR Probably right, Charlie.

04 03 31 43 LMP But the temps are good.

04 03 33 21 LMP That sunrise?

04 03 33 26 CDR Yep.

04 03 33 30 CMP Did you say you had sunrise, Charlie?

04 03 33 32 LMP It's coming up. We can see it glowing beyond the horizon.

04 03 33 36 CDR It's gonna be instant sunrise.

04 03 33 39 CMP ... doing? Man, looks like ... dark as ever.

04 03 33 45 LMP It's behind you, Ken.

04 03 33 46 CDR Yeah, it's behind you, boy. When it comes up, we won't be able to see you anymore.

04 03 33 52 CMP Okay; I've got you boresighted.

04 03 33 54 CDR Okay.

04 03 34 15 CDR Be kind of hard to get a radar lock. Oh, no.

04 03 35 24 LMP Yeow!

04 03 35 25 CMP Boy! Did you ever brighten up in a hurry!

04 03 35 34 CDR It was long before we got there though that we saw it, right?

04 03 35 37 LMP Right.

04 03 35 38 CDR Reckon light bends?

04 03 35 40 LMP Huh?

04 03 35 42 CDR Reckon the light bends?

04 03 35 44 CMP Man, are you ever bright!

04 03 35 49 CDR Where'd my glove go?

**CONFIDENTIAL**

04 03 37 40 CDR We were GO for PDI there for a while.

04 03 37 43 LMP Yeah.

04 03 37 47 CDR I can't ... We'd had no trouble at all picking up the site ...

04 03 37 54 LMP I know; it's beautiful. I guess you can't win them all.

04 03 38 10 CDR I'm not getting any cooling at all, Charlie. Are you?

04 03 38 13 LMP Cooling?

04 03 38 14 CDR Yeah.

04 03 38 15 LMP A little bit out of the suit. Not much.

04 03 38 23 CDR ... L ...

04 03 38 42 CDR Okay.

04 03 39 13 CDR Charlie, we ought to have ... You ain't hungry?

04 03 39 20 LMP No.

04 03 39 21 CDR How about something to drink, something like that?

04 03 39 24 LMP Back there in the food locker.

04 03 39 36 LMP I don't want anything, really.

04 03 39 38 CDR You don't? Okay.

04 03 39 42 LMP Unless they got a sandwich or something back there. I'll eat that.

04 03 39 48 CDR All they got is those drinks, Charlie. Orange drinks.

04 03 39 57 LMP Wait a minute. Open the top, John.

04 03 40 01 CDR I don't want to get too close to the hatch.

04 03 40 04 LMP Ain't nothing wrong with the hatch. ... okay.

04 03 40 15 LMP Those two on the left come open.

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04 03 40 37 CDR See? Orange drinks.

04 03 40 50 LMP That's all that's in there, is orange drinks?

04 03 40 52 CDR Well, there's some stuff behind it, but I can't get at it. I'm not - I just can't. I - I could reach it with the moving the orange drinks, but if I do, I don't know what I'm gonna do with them.

04 03 41 05 LMP Put them in the Flight Data File up here. There's plenty of room up here.

04 03 41 47 LMP Uh-oh. Excuse me.

04 03 41 48 CDR ... I keep - I keep getting ...

04 03 41 57 CDR Is this ...?

04 03 41 59 LMP Yeah. Either one.

04 03 42 18 CDR There is more pieces of metal around this spacecraft! You want a food - -

04 03 42 28 LMP It won't go in there?

04 03 42 30 CDR Might if I fold them in half.

04 03 42 32 LMP Stick them into the ISA then.

04 03 42 40 CDR There we go.

04 03 42 50 CDR I'd hate for that stuff to get ... in zero gravity. ... be a ...

04 03 43 06 CDR Charlie, you got me almost to PDI there.

04 03 43 11 LMP I tried hard.

04 03 43 12 CDR You did good.

04 03 43 18 LMP But if the gear don't work. Well, maybe they'll come up with something.

04 03 43 25 CDR How about a food stick? Can I have a food stick, Charlie?

04 03 43 29 LMP Sure.

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04 03 43 58 CDR ... where he is now.

04 03 44 01 LMP Probably down below him. Below us, rather. Hey, Ken, they want you to rendezvous at 100 hours, whenever that is.

04 03 44 10 CMP Yeah, I thought they said that was our closest point of approach, and it sure doesn't look to me like it's gonna be. Looks like we passed it back there about 20 minutes ago.

04 03 44 18 LMP Yeah, I - I agree with you. They want you to be active.

04 03 44 23 CDR There's no way they can tell what it is on these short things; they don't have any idea where we are, Char - Ken.

04 03 44 38 CMP Charlie, I'm going to try reacquire range and make sure I don't have a bad rate.

04 03 44 42 LMP Okay, I got 0.68 on the - -

04 03 44 45 CMP I got 0.52. Let me reacquire and we'll try it again.

04 03 44 52 CDR That ... That's not 1678.

04 03 44 55 LMP No, that's - -

04 03 44 56 CMP Say, could you could stay off the mike while I get it working?

04 03 45 16 CMP Okay, I have reacquired the LM. 0.55.

04 03 45 20 LMP Okay; you can start closing if you want, I guess.

04 03 45 25 CMP Yeah, I guess I will. I was gonna watch - watch the Sun here. It should scoot back around any minute.

04 03 45 31 CDR Yeah, just be - Hey, if you want us to give you ... range rate, we'll lock on you. How about that?

04 03 45 37 CMP I'm sorry. I didn't understand what you said, John.

04 03 45 39 CDR We should lock on you and give you range and range rate.

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04 03 45 43 CMP Well, I thought you were saying you didn't have your radar, and I thought that made good sense.

04 03 45 47 LMP No. We got plenty.

04 03 45 49 CDR We've got plenty of radar. We're going to do it.

04 03 45 51 CMP I thought you were trying to save on your Btu's.

04 03 45 54 CDR No. No, we got plenty of amps.

04 03 45 57 CMP Okay. Well, that would help. That's better than this thing.

04 03 45 59 CDR Dang right. Where are - Which way should we pitch to get to you?

04 03 46 05 CMP Beg your pardon?

04 03 46 06 CDR Which way should we pitch to get to you?

04 03 46 09 CMP Oh. Well, let me see here. All - Oh, boy. It's hard to tell what figures I'm looking at, it's so bright. I think I'm looking at the top of you, though.

04 03 46 26 CDR Okay.

04 03 46 28 LMP That's what it says, pitch up.

04 03 46 32 CDR ...., Charlie. ... updated it.

04 03 46 35 LMP Huh?

04 03 46 36 CDR ... updated it ...

04 03 46 38 LMP I said - Oh, you mean the radar?

04 03 47 35 CDR I don't see him anywhere.

04 03 47 42 CMP That's superbright. That must be - maybe I'm looking at the heat shield around your engine. That's probably it, because I can see the four gear. You - you must be pitched 180 to me.

04 03 47 57 LMP That's what I thought. He's been going in under us.

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04 03 48 03 CDR Well, why did you say pitch up?

04 03 48 05 LMP I didn't say that. ...

04 03 48 09 CDR You ain't gonna take credit for it, huh? ...  
I'd have swore I heard you say pitch up.

04 03 48 16 LMP Well, that's what the AGS says, but that ain't right.

04 03 48 19 CDR Well, ... You can't - Anything less ... Well, AGS is okay, but this thing here measures from the center of the Moon. I don't have the foggiest notion where our boy is.

04 03 49 31 CDR Hear that noise?

04 03 49 33 LMP It's in the comm. ...

04 03 49 41 CDR That's what I mean. ... back here. It's got something to do with the VHF ranging.

04 03 51 01 CDR Boy, I don't see him anywheres.

04 03 51 06 LMP Think we got quite a ways to pitch yet.

04 03 51 08 CDR Oh, shoot. ... Yeah, he's way far away from us. I think what the problem is, Ken, is you're opening up.

04 03 51 23 LMP Dead ahead, Ken. Push your RENDEZVOUS RADAR breakers in?

04 03 51 32 CMP I agree with you.

04 03 51 33 CDR You want to be careful how much velocity you add, because you're too low to add a lot.

04 03 51 39 CMP So far I've just put in 2 foot per second, but that's - that's even closing ...

04 03 51 45 CDR Okay.

04 03 51 47 CMP It looks like you're looking at me now.

04 03 51 49 CDR Well, at 2 foot per second, you should of took out 2 foot a second on account of you're ahead of us.

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Day 5

04 03 51 56 CMP Say again?

04 03 51 59 CDR Remember Mr. Kepler?

04 03 52 10 CMP Say again, John.

04 03 52 15 CDR Either way, 2 foot in or out will do it. That'll make him slow down ...

04 03 52 22 LMP Yeah.

04 03 52 28 CDR I'd rather have - There we go.

04 03 52 58 LMP Got him. Okay, he's still opening.

04 03 53 03 CMP Okay. What kind of a range do you read now?

04 03 53 05 LMP 0.66 miles and open, and it's 0.6 foot a second.

04 03 53 09 CMP Okay.

04 03 53 24 CMP Well, I guess I better put in another couple of foot per second then. Hate using all that gas on it, but I guess that's the only way.

04 03 53 50 CDR Let me get him boresighted and locked up.

04 03 54 08 CDR Well, let me get it like this.

04 03 54 10 LMP Okay. Thought we might have had a side lobe.

04 03 54 15 CDR Yeah.

04 03 54 18 LMP There you go. Go to LGC.

04 03 54 34 LMP Got a side lobe.

04 03 54 35 CMP Okay, what do you show now?

04 03 54 41 LMP Stand by, Ken. We had a side-lobe block. We're getting the main lobe.

04 03 54 44 CMP Okay.

04 03 54 48 LMP That looks like it, John. Oh, you want to go to -

04 03 55 04 LMP Okay; we close. Show 0.68 miles, 0 feet a second.

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04 03 55 12 CDR Yeah, you're 4200 out. It says here it -

04 03 55 20 LMP Okay; we show you -

04 03 55 35 LMP Better not add too much.

04 03 55 36 CDR No. I'd just hold what you got, Ken.

04 03 55 39 CMP Okay.

04 03 55 41 LMP ... drop way down. You know, if he - if he fires this way, it's retrograde; it's gonna drop him low - lower his orbit.

04 03 55 55 CDR How much did you put in?

04 03 55 57 CMP I put in a total of 3.5.

04 03 56 01 CDR Okay. Well, that's gonna get you right close to the ground.

04 03 56 05 LMP Not from over here.

04 03 56 10 CMP Well, I ain't gonna get very far from you.

04 03 56 28 CMP Am I closing any yet?

04 03 56 32 CDR No. It - it'll take half a rev.

04 03 56 34 CMP Okay, I'm not sure - it seemed to me like they gave us bum dope on this 100 hours.

04 03 56 44 CDR Yeah, you know they have no idea where we are.

04 03 56 47 CMP Yeah, but they know where we undocked and we haven't done anything. Think they ought to - -

04 03 56 51 CDR No, no. There's no way. Not for short ranges like this.

04 03 57 24 CMP I really wanted to get within half a rev. I guess that ought to be a radial burn, shouldn't it?

04 03 57 30 LMP Okay. We show you closing slightly now, about a half a foot a second.

04 03 57 35 CMP Okay.

**CONFIDENTIAL**

04 03 57 54 CMP Yeah, it shows it took me down to 8.6. But as long as I stick with you, I can't get too far away.

04 03 58 03 CDR Okay. Our RANGE RATE meter says you're 4100 foot out.

04 03 58 07 CMP Okay.

04 03 58 19 CMP What do you show for your - perilune?

04 03 58 23 LMP The what?

04 03 58 25 CMP What's your perilune?

04 03 58 35 LMP Ours says 11.0, Ken.

04 03 58 41 CMP Okay, I'm reading 8.6.

04 03 59 02 LMP I guess the five revs might have been, John, the - the high gain coverage ... our steerable ... work. ... long as we got the 210. ... gonna be hard to run - He's gonna take a lot of gas to get over here.

04 03 59 27 CDR Should have took it out.

04 03 59 30 LMP Huh?

04 03 59 42 CDR You thrusted toward us 3.5 feet a second. Is that true?

04 03 59 47 CMP I thrusted toward you 3.5. Yeah that was - looks like mostly retrograde.

04 03 59 55 LMP Yeah. Looks like to me you're gonna have to go up a little bit now, a couple of feet a second.

04 04 00 04 CMP Have you got some kind of a chart there I could navigate with?

04 04 00 07 CDR No, we sure don't.

04 04 00 08 LMP No. But, see, that retrograde burn is going to take you down, below us.

04 04 00 15 CMP Roger. I understand that. It really looks like what I want to do is make a radial burn, you

**CONFIDENTIAL**

behind me. I really ought to make a radial burn now, shouldn't I?

04 04 00 33 LMP Yeah. Shouldn't he?

04 04 00 35 CMP How about let's do that?

04 04 00 41 LMP Okay.

04 04 00 44 CMP What's my range and range rate now?

04 04 00 47 LMP 0.680 feet a second.

04 04 01 28 CMP Okay. There's 0.5 foot per second radial out.

04 04 01 33 LMP Okay.

04 04 02 09 LMP Man, it's really white into zero phase, isn't it?

04 04 02 25 CMP Sure looks to me like I'm opening again.

04 04 02 29 LMP Well, we got you about zero, Ken, maybe closing slightly. I think it's gonna take a couple of feet per second radial.

04 04 02 49 CDR He's got to go up like that. ... our mechanics, it may not ...

04 04 03 04 CMP I guess I'm getting a little concerned about that minus-X I put in there.

04 04 03 18 CDR Guess I don't blame you. I'd have thought you'd have put in plus-X and rose over the top of us.

04 04 03 25 CMP Yeah, I think I'm gonna take it back out and go the other way. That sound reasonable?

04 04 03 36 LMP Sure does to me, Ken.

04 04 03 55 CMP Okay; here we go.

04 04 04 27 CMP Okay, there's two - two power.

04 04 04 30 CDR Okay, now that shows you're opening at 3 and a - that shows you're opening at 3.

04 04 04 44 LMP Comes earthrise. See it?

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Page 233

Day 5

04 04 04 52 CDR Yeah.

04 04 04 53 LMP That's spectacular.

04 04 04 58 CDR Yeah. Now according to our mechanics, you're bound to end up behind us, and close to us.

04 04 05 07 CMP Okay. That shows I got a 59 by 9.

04 04 05 19 LMP Houston, Orion. How do you read?

04 04 05 24 CC Orion, this is Houston. Read you loud and clear.

04 04 05 26 LMP Roger; same-o, Jim. We're about 0.7 of a mile out from Casper now.

04 04 05 42 CC Say again, Charlie. We still have excessive noise ...

04 04 05 46 LMP I say our range to Casper is about 0.7 of a mile.

04 04 05 51 CDR And he's opening at 2-1/2. He put in some posigrade velocity to go up and above and come down and get with us.

04 04 06 06 CMP John, I think that total is still slightly retrograde.

04 04 06 12 CDR The total is slightly retrograde?

04 04 06 14 CMP Yeah. You know, I'm - I'm thinking we ought to go put some more in, what do you think?

TIME SKIP

04 05 09 49 CMP Yeah, I could tell I got you, but it's - it's a poor competitor for earthshine.

04 05 09 57 CDR Well, we ain't got any earthshine, old buddy.

04 05 10 02 CMP Beg your pardon?

04 05 10 03 CDR I say, we're gonna lose earthshine here in a minute.

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Day 5

04 05 10 05 CMP Roger. It will all of a sudden look very night.

04 05 10 24 CMP You can rendezvous under these conditions very nicely, the problem being that you've got to keep referring to the - to the reticle to get some kind of range, because there's just no - you still don't have enough depth perception to tell where you are.

04 05 10 36 CDR Right. You're gonna be clocking the Earth at - you're just slowly drifting to the north. You got the vertical line-of-sight rate killed.

04 05 10 45 CMP Okay; in order to have good comm - Okay, you just disappeared ... the spotlight on.

04 05 11 01 CDR You got the tracking light on?

04 05 11 02 LMP Yeah.

04 05 11 03 CMP I tell you, the spotlight isn't nearly as good as earthshine. I'm really surprised.

04 05 11 08 LMP We got a tracking light on, Ken.

04 05 11 10 CMP Yeah, I know. I'm - I'm using that. ... turned it over.

04 05 11 19 LMP You're closing at - at 500 - at 2 feet a second, 520 feet.

04 05 11 31 CMP Okay.

04 05 11 33 CDR Spotlight is probably good for 300 feet on in, Ken.

04 05 11 37 CMP That sounds like a good number. I can tell that you're out there. I can ... 3 hours ...

04 05 11 49 CDR Okay; you're at 510 feet, 2 feet a second.

04 05 11 54 CMP Okay. I'm really amazed how when you get range ... all the way in there. I'm at point - Well, I'm down to 0.09 now.

04 05 12 14 CDR Okay.

04 05 12 15 CMP Oscillating between 1 and 0.09.

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04 05 12 17 CDR Okay. VERB 40 should be - You're at 480 feet now, Ken.

04 05 12 21 CMP All right, sir.

04 05 12 24 CDR You're going to stationkeep, right?

04 05 12 26 CMP Yeah, I thought I'd come in to where I can guarantee a good spotlight.

04 05 12 32 CDR Okay.

04 05 12 34 CMP Then you can - I'd like to get a little closer before you power down the radar.

04 05 12 40 CDR Okay.

04 05 12 41 CMP Hello. Maybe this is where we ought to stop to keep from burning it out. What do you think?

04 05 12 48 CDR Ken, I don't know. If - if you want to get closer right now, I don't care. I think that - I would like for you to be in good stationkeep position and be sure what you're doing, and then we'll just go on around. Okay? Kind of dark out there.

04 05 13 08 LMP We can still see your probe.

04 05 13 12 CMP Yeah, I hope that's still there. We've got enough problems without that. Actually, the RCS ... doesn't look as bad as I thought it would.

04 05 13 25 CDR You better ... again.

04 05 13 27 CMP Say again?

04 05 13 28 CDR ... again.

04 05 13 40 CDR Okay, Ken. You're at 370 feet, 360 - 370 feet at - still at 2.

04 05 13 48 CMP Okay. ... It'll be daylight by the time we get there, won't it?

04 05 14 02 CDR Probably. Have you got me good enough to where I can shut off the radar?

04 05 14 07 CMP Yes, sir.

04 05 14 09 CDR Thank you.

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04 05 14 12 CMP What me to - want to slow it down?

04 05 14 17 CDR Yeah. Okay; you're - we still showed you with 2 feet a second. You still got it, man.

04 05 14 30 CMP Okay.

04 05 14 31 CDR We see you getting a hair bigger.

04 05 14 54 CMP Okay; I pulled off 1 foot.

04 05 14 57 CDR Okay.

04 05 15 15 LMP Okay; you can pull the breakers.

04 05 15 19 CMP If I knew where they were, there'd be no need to sweat it.

04 05 15 24 LMP Want me to turn those lights on?

04 05 15 37 CDR ...

04 05 15 40 LMP I thought I'd leave the tracking light on. Ken, do you need the tracking light?

04 05 15 45 CMP Well, you can turn it off and let's see.

04 05 15 49 LMP It's off.

04 05 15 51 CMP Nope, don't need it.

04 05 15 52 LMP Okay. 101:15.

04 05 15 59 CDR ...

04 05 16 29 LMP Boy, that landing site and that North and South Ray are really something, Ken.

04 05 16 34 CMP That sure is. I got a good look at them a couple of times.

04 05 16 37 LMP It looks just like the LMA.

04 05 16 41 CMP Sure looks different than it did yesterday.

04 05 16 43 LMP Yeah.

04 05 16 54 CDR Guess we better ... track. ... on the ground. ...

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04 05 17 17 CMP Boy howdy. That ...

04 05 17 23 CDR ... Yeah.

04 05 17 36 CDR Phew! There's no cooling on this thing at all.

04 05 18 19 CMP Sure looks like a jack-o'-lantern.

04 05 18 29 CDR Oh, me! Give me some water, Charlie. I'm really about to erp.

04 05 18 33 LMP Okay, just a minute.

04 05 18 47 LMP Well, you're in SUIT DISCONNECT. That's why.

04 05 18 49 CDR Huh?

04 05 18 51 LMP You're in SUIT DISCONNECT.

04 05 18 52 CDR Oh, no kidding?

04 05 18 53 LMP Yeah.

04 05 19 09 CDR What a ... Okay, you can shut that water off.

04 05 19 16 LMP Okay.

04 05 21 10 CDR Well, you're holding like a rock out there, Ken. Not using any thrusters, are you?

04 05 21 16 CMP Beg your pardon?

04 05 21 18 CDR Huh?

04 05 21 19 CMP I'm sorry. I didn't understand you.

04 05 21 20 CDR Not using any thrusters, are you?

04 05 21 23 CMP Yeah, I think so. Bound to be some for attitude control.

04 05 21 31 CDR Oh.

04 05 21 46 CDR What are you looking at, Charlie?

04 05 21 47 LMP The RCS.

04 05 21 50 CMP How you like the propellant position?

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04 05 22 21 CDR I just ... How about turning your ...?  
04 05 22 27 LMP ... over here. ...  
04 05 22 31 CDR Okay, ... little gadget ... I think ... 101:22:36.  
04 05 22 55 LMP I think you got ... pretty bad.  
04 05 23 01 CDR Is that what ...?  
04 05 23 02 LMP Yeah.  
04 05 23 40 CMP ... cut in here. ...? Seems like it ... on the gimbal? ...?  
04 05 23 51 CDR Boy, Ken. You got me there.  
04 05 23 53 CMP Did you understand?  
04 05 23 54 CDR I don't have any idea.  
04 05 23 56 CMP Hey, if y'all will turn the VOICE/RANGING off, maybe we can get better comm.  
04 05 23 59 CDR Okay.  
04 05 24 02 LMP It's off. How do you read?  
04 05 24 04 CMP Loud and clear. I got a - a squeal with you. But I got you good and - good and clear.  
04 05 24 13 LMP Ken, how do you read now?  
04 05 24 15 CMP You still got a real bad squeal.  
04 05 24 21 LMP Ken, over.  
04 05 24 22 CMP Loud and clear.  
04 05 24 27 LMP Okay, Ken, we have VOICE/RANGING back on. How do you read?  
04 05 24 30 CMP Well, it's a little scratchy, but clear.  
04 05 24 38 CDR Charlie, we must not be doing anything right.  
04 05 24 42 LMP Ken, how do you read?

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04 05 24 44 CMP Loud and clear.

04 05 24 49 LMP Okay, Ken. How do you read VHF B?

04 05 24 51 CMP Loud and clear.

04 05 25 10 LMP Okay, Ken. How do you read?

04 05 25 12 CMP Loud and clear. How me?

04 05 25 13 LMP Okay, if you read, I'm transmitting -

04 05 25 17 CMP Okay; are you getting - getting me now?

04 05 25 35 LMP How do you read, Ken?

04 05 25 36 CMP Loud and clear. How me?

04 05 25 38 LMP Okay; you're still a little garbled but okay. What are you transmitting?

04 05 25 41 CMP I'm transmitting on B and receiving on A.

04 05 25 49 LMP Okay. Why don't we try - I think it's our B RECEIVER. Why don't you try B DUPLEX? Transmit B - correction, transmit A and receive B.

04 05 26 00 CMP Well - Okay, just a second. Let's go to something simplex. That worked real nice.

04 05 26 09 LMP Okay, B SIMPLEX.

04 05 26 10 CMP Okay. B SIMPLEX.

04 05 26 20 LMP How you read B SIMPLEX?

04 05 26 22 CMP Loud and clear. How me?

04 05 26 24 LMP Still the same. You sound - you're a little garbled is all, but you're okay.

04 05 26 30 CMP Okay; you sound good.

04 05 26 32 LMP Okay. I think it's our B RECEIVER.

04 05 26 35 CMP Well, why don't we use A SIMPLEX then?

04 05 26 39 LMP Tag back back here in 30 seconds.

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04 05 26 43 CMP Say again?

04 05 26 45 LMP A SIMPLEX is no good. Tag back B SIMPLEX in 30 seconds.

04 05 26 49 CMP Okay.

04 05 27 01 LMP VHF A, Ken?

04 05 27 05 CMP Loud and clear.

04 05 27 08 LMP That's the best one. It - it's our B RECEIVER is a little scratchy.

04 05 28 35 CDR Ken, this in plane may be mighty bad if the Sun comes up and hits you in the eyes. I don't know which way you're pointed.

04 05 28 46 CMP I don't either.

04 05 28 50 CDR Find out right quick.

04 05 28 53 CMP Yeah. Well, if it is ... field of view.

04 05 29 01 CDR Yeah, I'm pointing - -

04 05 29 02 CMP It ought to - I think you're the one that's going to be looking into the Sun, because we're in - in an inertial attitude and I was looking at the Sun at sunset. I think the Sun's going to rise over my back.

04 05 29 22 CDR That'll be fine. I don't care.

04 05 29 32 CMP I'm glad to hear that because there's really not much that I can do about it.

04 05 29 39 CDR Yeah, I knew that there wasn't. You know, if we do PDI from now, it will be a miracle.

04 05 29 47 CMP I'm afraid you're right. And here comes the Sun. Man, are you bright.

04 05 30 00 LMP Well, Ken, at least our urine dump works.

04 05 30 04 CMP (Laughter) Well, I guess ... you have to have something to do. Have to get down and get that

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water in a few minutes. I thought about that on the last pass, and I thought I had - had more than enough time to get it squared away.

04 05 30 27 LMP Well, we don't see you venting anything.

04 05 30 29 CMP I'm not. Had a problem ... Afraid I'm gonna - gonna pop that relief valve if they don't ...

04 05 30 42 LMP Okay; well, are you - No. Hey, Ken, if you - you're in great shape. Why don't you go get it, and we'll - watch it.

04 05 30 55 CMP Let's wait until we get - get daylight on the whole spacecraft.

04 05 31 00 LMP Oh, we ain't got day - I got daylight on you.

04 05 31 02 CMP You have? Okay. That's a beautiful sight. All right, I'm going to go down and turn the dump on, and if it looks like it's going to obscure our vision, then I'll - holler and I'll turn it off right away.

04 05 31 16 LMP We'll do it.

04 05 32 08 LMP Bring that out of there! I can see why that's propulsive.

04 05 32 23 CMP Okay; I'm back at the capsule to visual.

04 05 32 29 CDR Okeydokey.

04 05 32 31 CMP Man, we must be over the Sea of Rain.

04 05 32 38 LMP Ken, you ought to see that dust squirt out of there.

04 05 32 41 CMP I can see it going past you.

04 05 32 45 LMP I got a good picture of that.

04 05 32 47 CMP That's good. Somebody will get something out of all this.

04 05 32 56 CDR Looks like you're translating your spacecraft.

04 05 32 58 CMP Yeah, I've picked up quite a drift here.

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04 05 33 40 CMP Man, that's a long wench coming over the cold north ...

04 05 37 56 CMP You guys have another dump going?

04 05 37 58 LMP No. This thing just catches this in a can down there, Ken.

04 05 38 03 CMP Oh. There was still something. Maybe it's just - my stuff was bouncing off of you.

04 05 38 08 CDR Hey, there's an icicle hanging off that dump.

04 05 38 11 CMP That right?

04 05 38 13 CDR Is you about to go ahead and terminate?

04 05 38 16 CMP I beg your pardon?

04 05 38 18 CDR \*\*\* popped your dump valve, there.

04 05 38 21 CMP Did you say something about terminating?

04 05 38 25 CDR \*\*\*nate your dump?

04 05 38 28 CMP If you want me to. Like I'm down to 50 percent.

04 05 38 35 CDR It's ice, I guess.

04 05 38 52 CDR That little door down there that's open, is that the solar door?

04 05 38 57 CMP Well, the solar door should be down off my left foot. Yeah, underneath the terminal lines of the urine dump - the water dump, rather. Can you see it from there?

04 05 39 12 CDR Sure can.

04 05 39 14 CMP How about that.

04 05 39 31 CMP If you'd like to yaw around and get the Sun out of your eyes - you can do that.

04 05 39 38 LMP We're in great shape. It's not in our eyes, Ken.

04 05 39 40 CMP Oh, okay.

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04 05 39 42 LMP Ken, your SIM bay is all retracted.

04 05 39 46 CMP Okay; how about taking a look at that mass spec. You - you know where that one is. That's the one in the - all the way in the aft shell, and it's the one towards the plus-Y axis.

04 05 39 58 CDR Cover's silver, right?

04 05 40 01 CMP Beg your pardon? The cover over it is white. The silver cover goes over the gamma ray.

04 05 40 09 LMP Okay; it's all - everything's in, and all the covers are closed.

04 05 40 16 CMP Okay. That's interesting.

04 05 40 19 LMP Following us?

04 05 40 22 CDR Yeah, he's drifting some.

04 05 40 30 CMP Yeah, I was trying to see what this dump did. Looks like it started out giving me DELTA-V and then it looked like it quit. Or at least it changed. It could be that it - if it's forming icicles out there, that it's deflecting us up.

04 05 41 17 LMP That big chicken's been over on this side again, Ken.

04 05 41 22 CMP Yeah. That sure is a fascinating place down there. ... good-size chicken, though.

04 05 41 42 LMP You said it was - once you tried it with the - in ACCEL COMMAND with the 204. Did that have - It said it looked like it was stable but oscillating. What does that mean?

04 05 41 57 CMP Well, it meant that it was pointing about plus or minus 1 degree. But it seemed to be pointing at 1 degree about the desired axis.

04 05 42 10 LMP We got you about 10 minutes on the dump, Ken.

04 05 42 14 CMP Okay; I'm down to 40 percent. I got my timer running here.

[REDACTED]

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- 04 05 42 23 LMP One for you, too. You know every crater - every one over here shows those lineations, like on 15.
- 04 05 42 32 CMP Yeah, I was noticing that. Everywhere I looked, I saw that. In the craters, in the highlands, in the - just the whole surface of the Moon is covered that way. I was about to decide it was an optical illusion, but the last time I came across Theophilus down low, it turned out that those lineations follow the depressions that touch the craters that are along the rim. Where - where there was a crater on the rim, you see these - these little lineations curve around it. They take the same pattern, like there is really a whole bunch of - of fractures there.
- 04 05 43 14 LMP Yeah.
- 04 05 43 19 CMP But you're right. They're everywhere. I haven't seen any place, except there's a couple of places around Descartes that looked to me like they didn't have it.
- 04 05 43 47 CMP All right. Let's see, if we delay - I bet one of the constraints may even be the Sun angle for me. Just trying to think - looking back at - at how much effect that Sun angle had between looking at that landmark last night and looking at it this morning. Last night you couldn't tell North and South Ray. You could tell that the craters were there, but you couldn't see any Rays. And this morning, the rays were very obvious.
- 04 05 44 15 LMP I think the constraint to landing is you.
- 04 05 44 18 CMP Well, I'm thinking that, if we get a - if we get a workaround, which right now, I'm fresh out of ideas. But they've given me clever ideas before.
- 04 05 44 30 LMP Yeah. Let me say I didn't mean that "you" literally.
- 04 05 44 34 CMP I understand. (Laughter) You don't - well, I guess you do feel worse than I do, but not a lot.
- 04 05 44 41 CDR It'd be better. You'd get shadows and - and then the shadow of the LM when it comes down, in case this landing radar does its thing again.

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04 05 44 52 LMP If we do go, it'll probably be - probably just a two-EVA sequence.

04 05 44 58 CMP Yeah. Yeah, it seems like the only hope is to get back on the time line and pick it up with the nominal numbers.

04 05 45 07 LMP Yeah, I don't think we can get a - have the consumables to stay for three EVAs.

04 05 45 17 CDR Not after all this, I don't think. Might not even be a one-EVA, or a one-EVA is about all, I guess.

04 05 45 30 CMP Well, unless - Your battery power may be down? I bet you could get two. Well, there's no sense in speculating. The numbers will come out of the computer. Man, that ... of yours sure is looking clean.

04 05 46 42 CMP Okay; down to 8 percent.

04 05 47 27 CMP Okay; I'm going to go down and shut it off.

04 05 47 31 LMP Okay.

04 05 48 24 CMP Okay; it's off, so it ought to tail off pretty quickly. It'll be ...

04 05 48 35 LMP Okay, we're looking at it now, Ken. It's still spitting out quite a few particles.

04 05 48 40 CMP Yeah. On this side, it looks to me like the particles have changed nature, though. They look like snowflakes now, when they looked like rain before.

04 05 48 48 LMP That's true.

04 05 48 49 CMP And they don't have the appearance of having the same velocity, but I'm not sure about that.

04 05 48 56 LMP No, they don't have the same velocity. They just sort of sublimating out of there. The other ones were coming out like a rifle shot.

04 05 49 24 LMP What time do you have AOS on the Flight Plan, Ken?

04 05 49 30 CMP Well, the schedule numbers all went out the window.

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04 05 49 44 CDR You got the dooby ... abort? Anybody?

04 05 49 51 CMP Do I have any more what?

04 05 49 53 CDR \*\*\* body. Our first CSM active rendezvous, too.

04 05 50 51 CMP Okay, Charlie, we're at 138 now, so at 155 before we pick up AOS and - Well, no, it should be about 145 at this altitude. That's - that's - it looks like we ought to get it pretty soon.

04 05 51 23 CMP Looks like all those little particles there, they're coming out and slowing it down. They look like they're just sort of stopping out there.

04 05 51 31 LMP Okay; it's almost stopped, Ken.

04 05 51 34 CMP The thing I haven't figured out is that the particles also look like they're coming out slower.

04 05 52 08 CMP Every now and then you get a blizzard. It looks just like you're really drowning in ...

04 05 52 52 CMP Okay; rough calculation says we should pick up AOS about 102:02. ...

04 05 55 16 CDR What's your best guess for P21, say, Ken?

04 05 55 20 CMP Where we are right now. We're about 125 degrees, probably about 30 miles high.

04 05 55 29 CDR I don't care. Just wondering when we was going to get acquisition.

04 05 55 33 CMP I'd say about 102:02, I think.

04 05 55 37 CDR Okay.

04 05 55 38 CMP That's about 100 degrees east and gonna be about 25 miles high. I got that out of our spiffy - spiffy little P29. He's doing longitude now. Get that. That wasn't a bad guess. We're now at a 121 and 33 miles high.

04 05 56 19 LMP Ken, the way that figure looks, we're down to one gimbal motor in yaw then, huh?

04 05 56 25 CMP Well, that's right unless they can find something.

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04 05 56 30 CDR Well, there's not much that they can find on the ground to fix it, though.

04 05 56 34 CMP Well, they may find some crude control mode that you could use in here that would make it oscillatory but not unstable. It's the divergence ... it's tracking. If it had been just the ... we got to go ahead and burn; then we go ... the Moon.

04 05 57 02 CMP I tell you, that thing is really threatening to whip around to the back end. Think it'd just be ... like that.

04 05 57 22 CDR They've got the data from one that you'd let it do that on a little?

04 05 57 27 CMP Yeah, I showed it to them on two separate occasions on that last pass. Both times, they had high gain all the way. So there should be no question about it.

04 05 57 55 CMP I just really didn't follow their comment about what they were trying to duplicate conditions on the simulator.

04 05 58 13 CDR Well, they want to make - make it unstable and see if somebody can fly it. Would you believe?

04 05 58 24 LMP Hey, Ken. If they let us go, boy, I'll tell you, if you ask me, you ought to just forget about that MEP - EMP thing, and just leave the gimbal motors on those 6 minutes.

04 05 58 51 CMP Well, I really don't really know if that had anything to do with it or not. It - it would seem that, with this being our first gimbal problem and that's the first time we've done that, that would seem like a reasonable thing to suspect. But if that's what they suspect, then - then the next answer is pull the ...

04 05 59 17 LMP First answer's what - second answer's what?

04 05 59 21 CMP We've got AOS, looks like.

04 05 59 29 CMP Hello, Houston.

**CONFIDENTIAL**

Day 5

## TIME SKIP

04 07 02 13 CDR What time did they say AOS was, Ken?

04 07 02 17 CDR Well, the reason I ask, Ken, is, for this P52, I need to be close to the right attitude to pick up your story.

04 07 02 34 CDR My eight-ball in normal.

04 07 02 42 CDR Oh, let's try it and see what happens.

04 07 02 45 CMP ...

## TIME SKIP

04 07 14 15 CMP Okay. CAUTION/WARNING's back to NORMAL. TVC SERVO POWER number 1 and number 2 are on. RHC is to AC. DIRECT is OFF. The BMAGs are uncaged. I'm in SCS.

04 07 14 43 CMP MARK it. Seven minutes, the gimbals are coming on. One, PITCH; one, YAW. Pitch looks good, trimmed at 1.5. Yaw looks good, trimmed at 1.2. MTVC; good in pitch; it's good in yaw. Turn the THC control. Goes back to zero. No MTVC. Going clockwise. No MTVC. Secondary GIMBAL; PITCH 1. MTVC is good. Thumbwheels are good. Back to neutral. AC/DC; MAIN A, MAIN B. BMAGs are caged.

04 07 16 17 CMP Gimbal drive check; minus 2 in pitch, plus 2, minus 2 in yaw, zero. And they're trimmed. Trims are good. And P509 is coming out.

04 07 16 43 LMP Hey, how about going VOX, Ken.

04 07 16 45 CMP I am in VOX.

04 07 16 57 CMP Are you reading me in VOX, Charlie?

04 07 17 03 LMP Yeah, your VOX circuit was like a key, but it's fine.

04 07 17 17 CMP Okay; 509 is out.

**CONFIDENTIAL**

Day 5

~~CONFIDENTIAL~~

Page 249

04 07 18 15 CMP Okay. I'm strapped in. I'll turn the VOX up ... a little if that'll help.

04 07 18 21 CDR It would sure be good.

04 07 18 23 CMP Okay. And I'll try to talk to you as loud as I can and good. Burn time is 5 seconds. Two jets for 16 seconds, the ullage. Coming up on 3 minutes to burn. EMS is in DELTA-V; the DELTA-V<sub>C</sub> is set.

04 07 18 58 CMP And I'm bringing on the YAW GIMBAL number 2 -

04 07 19 02 CMP MARK. And ... that's a good sign.

04 07 20 26 CMP Coming up on 1 minute. Stand by.

04 07 20 44 CMP One minute. EMS is NORMAL. TRANSLATION POWER is ON. The DELTA-V THRUST switch A is coming ON -

04 07 20 54 CMP MARK.

04 07 21 11 CMP DSKY is blank. Average g is on.

04 07 21 28 CMP Ullage; ullage is good.

04 07 21 40 CMP PRO.

04 07 21 44 CMP IGNITION.

04 07 21 50 CMP SHUTDOWN. Looks like a good one.

04 07 22 08 CMP Gonna have to do some trims.

04 07 23 07 CMP Okay; I'm gonna have to roll to get the - to trim out.

04 07 23 48 CMP Might know this little guy would be the one that takes the Z-axis trim that you have to roll for.

04 07 23 54 LMP Why do you got to roll, Ken? Because of jets?

04 07 23 57 CMP Yeah.

04 07 24 34 CMP The GIMBAL MOTORS are OFF.

04 07 24 39 LMP You got about a 20-hour charge on those batteries, I bet you.

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04 07 24 42 CMP Yeah. Okay, let me cut this Beta. I have a residual of plus 0.2, plus 0.2, zip. Attitude - 61 -

04 07 25 30 CMP Okay, I'm going off VOX. Have a good trip.

04 07 25 38 CDR \*\*\* one, Ken.

04 07 28 31 CMP Okay, Orion, you don't need any further data for the P56, do you?

04 07 28 36 CDR No, we got it all, Ken. Thank you.

04 07 28 39 CMP All right. Sorry we held you up so long.

04 07 28 44 CDR No problem.

04 07 28 48 LMP We're just happy to be on our way, babe. That was great. Hang in there.

04 07 28 55 CMP I'm gonna have to buy some of those cats a couple of cases of beer when we get home.

04 07 29 00 CDR You can bet.

04 07 29 01 CMP Like a light to the blind.

(NO COMMUNICATIONS FOR 10 MINUTES)

04 07 39 47 LMP Okay, Ken, I think we ought to go back to the VOICE RANGING on the VHF. Is that what your PDI switch list called for?

04 07 39 57 CMP Okay.

04 07 40 04 CDR Ken, do you read? Over.

04 07 40 06 CMP Loud and clear. How me?

04 07 40 14 LMP Ken, do you read? Over.

04 07 40 16 CMP Loud and clear. Did you copy him on VOICE RANGING?

04 07 40 26 LMP Houston - Ken. Over.

04 07 40 29 CMP Do you copy me now?

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04 07 40 31 LMP Yeah, I copy you now.

04 07 40 34 CMP I went to VOICE RANGING and DUPLEX Bravo, and I could hear you, but I couldn't receive.

04 07 40 40 LMP \*\*\* read now?

04 07 40 44 CMP How about now; do you hear me? Okay, I'm talking to you on the A SIMPLEX but I'm not getting through to you on the B DUPLEX.

04 07 40 56 LMP Okay. You weren't getting through on B DUPLEX, because I was - I was - had B RECEIVER OFF.

04 07 41 05 CMP That'll do it.

04 07 41 06 LMP Okay, I'm gonna go VOICE RANGING and B RECEIVER, okay?

04 07 41 12 CMP Okay.

04 07 41 16 LMP You can put B to RECEIVE over there, John?

04 07 41 19 CMP ..., sir.

04 07 41 20 LMP Okay, you're a little scratchy, but okay.

04 07 41 23 CMP All righty.

04 07 41 28 LMP My helmet looks like my training helmet now.

04 07 41 31 CDR Yeah.

04 07 41 41 LMP What time do you have, John?

04 07 41 45 CDR I've got - Well, my clock is wrong.

04 07 41 50 LMP Ken, what time do you have, Houston time?

04 07 41 54 CMP I got - 22 minutes of 8.

04 07 41 58 LMP Okay, thank you.

04 07 42 01 CDR What I haven't been able to figure out is whether it's a.m. or p.m.

04 07 42 04 LMP p.m.

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**CONFIDENTIAL**

04 07 42 14 LMP You can feel those thrusters burn.

04 07 42 16 CDR Yeah.

04 07 42 21 LMP Okay, 35 minutes, the ASCENT BATs are coming ON. They're ON - at 103:42.

04 07 42 38 CDR Okay, if we're 66,000 feet, we're probably gonna have 10 or 15 or 20 feet a second more to start with.

04 07 42 44 LMP Yeah. Okay; THROTTLE CONTROL we got. LMPs we got.

04 07 42 48 CDR Yeah.

04 07 42 49 LMP RATE SCALE, 25 DEGREES PER SECOND?

04 07 42 51 CDR Go.

04 07 42 52 LMP ATT/TRANSLATION, 4 JETS?

04 07 42 54 CDR 4 JETS.

04 07 42 55 LMP Okay. Check DCS [sic] - DPS, APS, RCS. Let's go look at the DPS. Okay. APS - was okay. Okay. Okay, there we go. Press 1, press 2. Pressure's coming down. It must be cooling off. Supercrit ... - but that ambient's okay. Okay. Okay?

04 07 43 38 CDR The switch guards are checked.

04 07 43 41 LMP Okay. ECS looks good.

04 07 43 52 LMP Bias my gages, and EPS.

04 07 44 10 LMP Okay? The commander's BUS, INVERTER 1.

04 07 44 18 CDR INVERTER 1 is closed, Charlie.

04 07 44 20 LMP Okay; going DESCENT 1.

04 07 44 23 CDR Okay; we've still got the S-band antenna open.

04 07 44 26 LMP That's okay. That's just the high gain; and we're not using that.

04 07 44 29 CDR Okay.

**CONFIDENTIAL**

Day 5

~~CONFIDENTIAL~~

Page 253

04 07 44 45 CMP Coming up at AOS in a moment - at 6 minutes.

04 07 45 39 CDR See my - It's shedding.

04 07 45 41 LMP It is? Yeah, I know. Uh-huh. Right out front.

04 07 45 51 LMP I wish I had a drink of water.

04 07 46 47 CDR I don't know what that noise is, but it really is something.

04 07 46 50 LMP It sure is.

04 07 47 58 LMP Man, that really is something. We don't even have VHF RANGING on. Well, we got it on, but Ken's not locked up.

04 07 48 18 CDR That Moon is really some kind of place!

04 07 48 22 LMP Yeah.

04 07 50 13 LMP Okay, it's gonna be almost - by - let's see, we're 6 hours late and it's 3 degrees - about a 15-degree Sun angle, John.

04 07 50 20 CDR Okay. Whatever that means, Charlie.

04 07 50 23 LMP Whatever that means.

04 07 51 52 LMP We'll be having AOS here, momentarily.

04 07 52 00 CDR Okay, I'm AGS initialized.

TIME SKIP

04 08 11 24 LMP Roger. Copy.

04 08 11 36 LMP Why don't you pull me right up under my - little \*\*\*

04 08 11 50 LMP Okay, 05:36, John. Everything looks great.

04 08 12 00 LMP Hey, Casper, how do you read? Over.

04 08 12 06 LMP \*\*\*

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04 08 12 10 CDR Okay; 5 minutes, LANDING RADAR breaker is going closed.

04 08 12 14 LMP BAT 3 is ON.

04 08 12 16 CDR ALTITUDE TRANSMITTER is 3.4, almost. VELOCITY TRANSMITTER is 0.82.

04 08 12 30 CDR What's the ALTITUDE TRANSMITTER?

04 08 12 34 LMP 3.8.

04 08 12 43 CDR Correct.

04 08 13 13 CDR Roger. GO for PDI. Okay, PRO for final trim.

04 08 13 22 LMP Go. ... DET. Go ahead. ENTER.

04 08 13 31 CDR ENTER.

04 08 13 35 LMP Go. My watch is set and wound.

04 08 14 04 CDR ... about a second off here.

04 08 14 10 LMP Okay. Sta - stand by for 2 minutes, John.

04 08 14 12 CDR Roger.

04 08 15 10 CDR Fantastic!

04 08 15 14 LMP Target about 10 miles, it looks like. Excellent.

04 08 15 23 LMP Okay; 2 minutes; MASTER ARM, ON.

04 08 15 28 CDR Two minutes, MASTER ARM's ON; two lights, Houston.

04 08 15 32 LMP PGNS is MODE SELECT; P67 is in. Next thing is at 30 seconds, John. Turn the page.

04 08 16 08 LMP Hey, Jim, you want us to turn the ranging back on?

04 08 16 15 LMP Okay. We have VOICE BACKUP.

04 08 16 37 LMP Fifty seconds.

04 08 16 47 LMP Okay. At 30, we hit ENGINE ARM; then we - 30 seconds, ENGINE ARM goes to DESCENT, then we - -

**CONFIDENTIAL**

Day 5

~~CONFIDENTIAL~~

Page 255

04 08 16 54 CDR ... light. PRO.

04 08 16 58 LMP Okay. ENGINE ARM, DESCENT.

04 08 17 01 CDR ARM is DESCENT; ALTITUDE light, VELOCITY light.

04 08 17 04 LMP Okay. There's no ullage plus-X.

04 08 17 06 CDR Okay.

04 08 17 13 LMP If no ignition, you START pushbutton, if we get ullage.

04 08 17 19 LMP Ullage.

04 08 17 20 CDR Auto ullage.

04 08 17 21 CDR/LMP PRO.

04 08 17 27 LMP Okay. Engine START.

04 08 17 28 CDR START. DESCENT ENGINE COMMAND OVERRIDE is ON.

04 08 17 30 LMP Stick your throttle in MIN.

04 08 17 34 CDR ...

04 08 17 38 LMP Okay, DESCENT ENG - ENGINE COMMAND OVERRIDE; MASTER ARM, OFF.

04 08 17 41 CDR MASTER ARM is coming OFF.

04 08 17 44 LMP Stand by for throttle up; thrust-to-weight is okay.

04 08 17 48 CDR 22, 23, 24, 25, 26 -

04 08 17 52 CDR/LMP Throttle up!

04 08 17 53 CDR On time!

04 08 17 54 LMP Feel that beauty come on. Okay; thrust-to-weight is good - 66,000 feet. They were right on.

04 08 18 17 LMP Looking good at a minute. Hey, Jim, at pitchover, do you want me to go AFT omni or stay FORWARD?

04 08 18 30 LMP Roger. Hey, we're way high, John, we got to get down. Way high on the H-dot.

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04 08 18 35 CDR All right. ..., Charlie. Down to 45 already. How am I doing?

04 08 18 53 LMP Systems look good. Passing 01:30. Double H-dot almost.

04 08 19 01 CDR ...

04 08 19 02 LMP Go ahead.

04 08 19 03 CDR Go ahead.

04 08 19 11 LMP Plus 00800.

04 08 19 15 CDR Interesting, isn't it?

04 08 19 17 LMP Okay; we have - Excuse me, John.

04 08 19 19 CDR Okay. That's entered. That's entered.

04 08 19 26 LMP Passing 2 minutes.

04 08 19 28 CDR And I'm looking good.

04 08 19 29 LMP Okay, we're going to have to yaw out here at 3.

04 08 19 40 LMP I can take that out when we get ... dot. AGS and PGNS are tracking right on, Jim - within a tenth of a foot a second.

04 08 20 03 CDR \*\*\* 3 minutes; propellants.

04 08 20 14 LMP Pressures are holding good in the - DPS.

04 08 20 18 CDR All oxidizer pressures looks good.

04 08 20 26 LMP Three.

04 08 20 27 CDR Roger. GO at 3.

04 08 20 30 LMP I'll check the ED batteries one more time. And they're still 37 volts, Jim.

04 08 20 42 CDR VELOCITY light's out, Charlie.

04 08 20 44 LMP Okay.

04 08 20 46 CDR Wrong transmitter, probably.

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04 08 20 48 LMP We got a \*\*\* ... \*\*\* way.

04 08 20 59 CDR Cutting out, Charlie.

04 08 21 00 LMP I say there's no way to \*\*\* get that altitude light at this high.

04 08 21 13 LMP \*\*\* minutes.

04 08 21 27 LMP We're 50,000. Look at that, ALTITUDE and VELOCITY lights are out at 50K. Isn't that amazing? Copy that, Houston? Look at that data, Houston. When do you want to accept it?

04 08 21 58 LMP Okay; it's in.

04 08 22 18 LMP AGS and PGNS will be getting off a little bit in altitude now. Updates.

04 08 22 26 LMP Okay, at 5 minutes. Coming in like gangbusters.

04 08 22 35 CDR Roger.

04 08 22 50 LMP 39,000. Hey, look at that - hundred - 136 feet difference now. \*\*\* radar.

04 08 23 09 CDR Roger. We'll get there.

04 08 23 13 LMP Six minutes; we should be at 32,000. \*\*\* not quite back on profile, but almost.

04 08 23 21 CDR ...

04 08 23 24 LMP \*\*\* 45 percent \*\*\* ... \*\*\* ...

04 08 23 52 LMP Okay, at 06:30, should be at 30,000.

04 08 23 57 LMP MARK it; 32,000 \*\*\* Okay; looking good, John. Sun angle's getting down there. AGS and PGNS H-dot are right on. Good enough.

04 08 24 20 LMP Understand; 07:23.

04 08 24 27 LMP Seven minutes -

04 08 24 28 LMP MARK it; 7 minutes. Roger; go; 104 down and 28,000; still about a thousand high, it looks like.

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04 08 24 37 CDR ... look pretty good?

04 08 24 38 LMP Yeah; 223 \*\*\* ready; the AGS ready at 14K. Then I do a 360 and then turn the camera on. Breaker's in. Throttle down.

04 08 24 58 CDR \*\*\* on time.

04 08 25 01 LMP It was right on time, wasn't it?

04 08 25 05 LMP How you reading, Jim?

04 08 25 10 LMP Okay. You were clipping a little bit, John.

04 08 25 12 CDR Okay.

04 08 25 21 LMP 21,000; coming up on 8 minutes.

04 08 25 25 CDR \*\*\* I can see the landing site from here, Charlie.

04 08 25 27 LMP Amazing.

04 08 25 28 CDR \*\*\* - -

04 08 25 29 LMP Okay, GO at 8. John's got a visual.

04 08 25 33 LMP 130. We're right on, John. Right - right back on profile.

04 08 25 48 LMP How does it look to you?

04 08 25 50 CDR \*\*\* right in there.

04 08 25 51 LMP Okay, standing by to update the AGS. Had a little roll steering here.

04 08 26 02 CDR Roger. DESCENT 1.

04 08 26 08 LMP Hey, Jim, we got about a 3-degree roll command in. Okay, ENTER, 360 minus 01720 ENTER; 367 is coming up, and I'm starting the clock - I mean the camera. Okay, we're out at 12,000, John. GO at 9. Coming down at 182; a little steep. Okay, well, we're gonna be right on. It's just about right on, maybe 10 feet; 10,000 feet. Stand by. P64 at 8200. PRO.

04 08 26 54 CDR Pitchover.

**CONFIDENTIAL**

Day 5

~~CONFIDENTIAL~~

Page 259

04 08 26 55 LMP Pitchover. Hey, there it is. Gator, Lone Star, right on!

04 08 26 59 CDR Call - call me the things, Charlie.

04 08 27 01 LMP Okay; it's 40 deg - 38 degrees. Palmetto and Dot, North Ray.

04 08 27 07 CDR Okay.

04 08 27 09 LMP Looks like we're going to be able to make it, John. There's not too many blocks up there. Okay, 4000 feet - 4 - 4 - -

04 08 27 16 CDR Okay. GO for landing.

04 08 27 17 LMP - - 42 LPD.

04 08 27 18 CDR 42 \*\*\*

04 08 27 20 LMP Okay, 3900 feet.

04 08 27 23 CDR Okay. Two to the south, Charlie.

04 08 27 24 LMP Okay. It's in. Okay, 42 - 41 LPD. 3000 feet on profile.

04 08 27 31 CDR Okay, there's - we're coming right down. Going to be a little past ... - -

04 08 27 37 LMP 41 LPD.

04 08 27 38 CDR Okay. ... - -

04 08 27 42 LMP 2000 feet, 60 on profile.

04 08 27 43 CDR Okay.

04 08 27 48 LMP Okay, 42 LPD. Couple of more in. 1400 feet, 44 down. Looking good. Okay, out at 1000 feet. Right on profile. 54 LPD; dropping out the bottom now. 800 feet, 30 down.

04 08 28 12 CDR Okay, Houston. We're going to be just a little long. But, we're just now abeam Double Spot.

04 08 28 20 LMP Okay, 23 - 22 down at 500 feet.

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**CONFIDENTIAL**

Day 5

04 08 28 25 CDR Okay.

04 08 28 26 LMP Some big blocks over here to the left, John.

04 08 28 28 CDR Okay.

04 08 28 31 LMP Okay, 300 feet, 15 down.

04 08 28 33 CDR Okay. Okay. Take over, Charlie.

04 08 28 37 LMP Okay. Okay, fuel is \*\*\* at 10 percent. There comes a shadow. Okay, 200 feet, 11 down. Give me a couple of clicks up. Okay, 5 down at 130 feet; 2 forward.

04 08 28 59 LMP LO MULT. Drifting. Okay; looking good. Perfect place over here, John. A couple of big boulders. Not too bad.

04 08 29 07 LMP Okay; 80 feet, down at 3 - looking super. There's dust.

04 08 29 13 LMP Okay, down at 3, 50 feet. Down at 4. Give me one click up. Okay, back it up slightly.

04 08 29 21 LMP Okay, 2 down. Stand by for contact. Come on, let her down. You're leveled off. Let her on down. Okay, 7 - 6 percent. Plenty fat.

04 08 29 36 LMP CONTACT. Stop. Boom. PRO. ENGINE ARM. Wow! ... man. Look at that!

04 08 29 47 CDR PRO. ENGINE ARM. DESCENT ENGINE COMMAND OVERRIDE.

04 08 29 50 LMP Okay.

04 08 29 51 CDR Okay, 413.

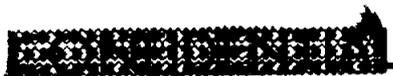
04 08 29 56 LMP ... in. Check the APS.

04 08 29 58 CDR Well, we don't have to walk far to pick up blocks, Houston. We're among them.

04 08 30 03 CMP Good show, gang.

04 08 30 04 LMP Close, open, close. Old Orion is finally here, Houston. Fantastic!

**CONFIDENTIAL**



04 08 30 11 CDR And I can look right out to the left and see - see Double Spot, and we're about - -

04 08 30 20 LMP Okay, you got it.

04 08 30 22 CDR Okay, we're forward and to the north - forward and to the north of Double Spot; I would guess about 200 meters to the north and maybe 150 meters to the - to the west. \*\*\* It's not flatlands, though, Houston.

04 08 30 45 LMP Well, that attitude is super though, John.

04 08 30 51 CDR Yeah, and I could see - I could see all the way to the ground. Just like flying the LTV - piece of cake.

04 08 30 57 LMP \*\*\* good. Ascent pressure - -

## TIME SKIP

04 09 18 46 CMP Okay, mapping camera I just did.

04 09 22 15 CMP (Yawn)

04 09 28 03 CMP Okay, the LASER is ON. The camera is extended, and the cover is open.

04 09 29 04 CMP Okay, coming up on 29:57 for a PAN CAMERA OPERATE.

(NO COMMUNICATIONS FOR 17 MINUTES)

04 09 46 31 CMP Mm-mm!

04 09 48 14 CMP Okay, if you're listening, tape recorder, we're passing over King now. And - something I hadn't noticed before kind of unusual out here. There's a lot of clumpy material all around King. The central peaks definitely have big blocks sticking up in them. The things that we've called dark material are not dark, but rather they are big blocks that cast some pretty long shadows. They look like they're piled on top of some very soft and unconsolidated material. But they are indeed



**CONFIDENTIAL**

Day 5

big blocks on the central peaks. And - I'll also say that they're on - surprisingly, they're mostly on the eastern side, but there are some on the western side. The floor of the crater looks like a big, big flow - lots of flow bands and things. In the crater rim to the west, it looks like there's a definite textural change at the top; and it looks like it has a dark band and then a light band, then it goes back to the same old dark gray. This entire area has a large amount of light material around it. It is not entirely associated with - with the - the crater King. It looks like there's an area in - We've even come into some new swirls I didn't know had existed, but I think they do. And I got a picture to take here. Well, I'll get a picture of them next time around. Let's look for a topographic expression.

04 09 50 51 CMP Where'd you go, you sucker? (Sigh) What'd that color wheel say I should have here? Let's see, 1/250 - f/8.

04 09 53 11 CMP Hello, Houston; Casper.

04 09 53 19 CC ...

04 09 53 21 CMP Loud and clear.

04 09 53 39 CMP Henry, I'm gonna - Okay, barber pole plus 3.

04 09 53 58 CMP You have it. And would you remind me when you get about 30 seconds from PAN CAMERA to STOP.

04 09 54 09 CMP Okay.

04 09 54 19 CMP I want to mark something on my chart, and then I'll talk to you for just a minute.

04 09 54 52 CMP Okay. And I put BATTERY A on CHARGE at 105:35.

04 09 55 31 CMP I got you out the window now, but it looks like - like half of you has gone away. It's all black.

04 09 55 47 CMP Oh, I bet you were in the dark half, weren't you? That shows how long it's been since you been outside.

**CONFIDENTIAL**

Day 5

Page 263

~~CONFIDENTIAL~~

04 09 56 09 CMP

As I came over - I finally got squared away and, as I came across King, I had the binoculars out. And sure enough, on the - on the central peaks down there, the things we've been debating for so long, about whether they were streaks or outcrops or what they were, are large blocks which are on the - the central peaks. Most of the blocks seem to lie on the eastern side of the peaks; however, there are a few blocks on the western side, enough that you can tell that the reason they look dark is they cast some pretty long shadows because they're pretty huge blocks. The floor looks like it's - looks like an old mud flow. It's really a - a strange-looking floor. It's got lots of flow bands and patterns in it, and the crater rim to the west on the interior shows at least three distinct shades of this gray. The upper one is the same color as the surface, which is a light - sort of a darker gray. Then there's a light gray band, which runs parallel to it. And then a dark band begins below that. And the light band is perhaps a quarter of the depth of the crater wall. To the north and west of King, I ran into some things that look like the same sort of swirls we've been looking at up around Al-Biruni and around Reiner Gamma. These, too, are in the highlands. And, with the binoculars, it's my impression that these probably have a certain amount of relief - topographic relief with them. But they look - when you look straight down on them, they look exactly like the other things we've been looking at. And I took a quick picture of that thing, and I put it on magazine Victor. And if you'll keep a record of these things, that - that one is on Victor at exposure - Oh, excuse me, it's magazine November November, and that's exposure 41.

04 09 58 35 CMP

You've got AUTO now.

04 09 58 45 CMP

And it's oscillating. Suppose I go back to - There it is. Okay, I have a - a little tone in my headset that was beeping very softly, and the - the signal strength was doing the same thing.

04 09 59 22 CMP

Okay, the computer's in BLOCK.

04 09 59 24 CC

...

~~CONFIDENTIAL~~

**CONFIDENTIAL**

04 09 59 26 CMP Okay. I'm in STANDBY.

04 09 59 31 CC ...

04 09 59 34 CMP (Laughter) Okay. No sweat; we got it done. I'll check the optics and, when you're ready, I'll start the - configuring the SIM bay.

04 10 00 03 CMP And, Hank, would you verify that it's okay to take the optics and put them to CMC and - or to zero them? I sure don't want to take any chances with it.

## TIME SKIP

04 11 28 27 CMP Okay; we're coming up on the crater Sharonov, and we're trying to catch up on the photo pass. And I'm aimed roughly between Sharonov and Anderson. And we'll fly along here until Spencer Jones, and the next time we have something coming up is an IMC change at 38. Sharonov is a rather interesting crater. It's got a lot of big slumps that are in the wall to the east that you don't see, looks like the western wall. They're in the shadow, but they're very, very predominant slumps, some with little craters. They look very smooth and rounded. In fact, they - the walls to the south look smooth and rounded compared to the - to the walls that are lighted by maybe a sunlight illumination effect. There's a - Across the Moon, now, we see several different kinds of material, and there doesn't seem to be any exception. We see Cayley-like material which is - this altitude, is anything that has lots of little pits and relatively smooth surfaces. And coming up now on Spencer Jones. And we see that this area out here has a - a lot of gently rolling topography. You see streaks of it, and then - well, I see some little hummocks, and then I see it going out to smoother areas. I'll try to compare this with the - with the Cayley. I see several places where there's little clusters of holly [?] cratered area. I see there are more craters than the - the average that you would expect.

**CONFIDENTIAL**

- 04 11 30 58 CMP Shifting to 1/250. 1/250 I shifted to at Spencer Jones. I'm shifting a little later because it's a rev later. Spencer Jones is again another one of these strange ones that looks like it's slumped. It looks like it's been here forever with slumps in it. They're all around it. They don't have sharp terraces anywhere. I have the impression that within the material that comes from Spencer Jones down - down into Pap - Papaleski is even smoother, and it looks like it flows down in there and just creeps over it. And this is true all over the north - excuse me, the northeast and also the southwest side.
- 04 11 32 01 CMP Take a quick look down in there. Back to our strip.
- 04 11 32 23 CMP Apparently some of these things I'm looking at north of Papaleski there that they're unnamed on our - our chart, but look like they're just filled with so much stuff, big blobs of things that couldn't all be slumps that just fell down from the side, but they'd almost have to run in to form the kind of blobs that they have. There's one here that - It's a little to the north. It's a very strange-looking thing.
- 04 11 33 30 CMP Man, everywhere you look there's craters and craters and hills. Hummocks up on the northern horizon. Let's get one shot of that stuff. Okay. Well, I guess that I'm not coming up on Van Gent. And I guess it's about time for me to shift to - to an f/8.
- 04 11 34 59 CMP Man, there's more of that stuff. It's just all over here. What looks like areas have just flown down into these big ditches.
- 04 11 35 25 CMP Okay; there's the end of that strip.
- 04 11 35 44 CMP I've got Mendeleev - out here also.
- 04 11 36 26 CMP Okay; at 38, going barber pole plus 3.
- 04 11 36 40 CMP Hilly. Stop taking it across the wall. Oh, I should have taken that thing. Oh!
- 04 11 37 12 CMP Okay; at 38, go barber pole plus 3.

**CONFIDENTIAL**

04 11 37 23 CMP Barber pole; 1, 2, 3.

04 11 37 49 CMP Okay. Catch Mendeleev.

04 11 38 30 CMP Oh, come on. There we go.

04 11 38 51 CMP MANUAL and WIDE, okay. ... setting ... f/11, 1/250. Okay, take pictures.

04 11 39 06 CMP MARK. That's magazine November November again.

04 11 39 57 CMP Right up over Green. Mr. Hartmann and Mr. Green.

04 11 40 14 CMP Well, there's some very, very smooth places in the floor out here.

04 11 41 37 CMP Well, got a lot of smooth floor areas that slump and come right up over this crater. And that just looks like so much gypsum out there; it's just soft. I just can't believe any of that stuff has ever been crystal. Interesting little patterns on these little hills down here. Got a little ripple to it.

04 11 42 28 CMP Ha! There's definitely a dark albedo unit that comes down through here. I don't think I understand.

04 11 42 51 CMP Boy, it sure shows in the binoculars as an entirely different texture. When you look at it, it doesn't look surprisingly so much. Just to the north - just to the northeast of Green, there is a distinctly different textured unit that shows up. It looks like a flow. It's just spread out in there. And it does indeed look distinctly different. The terraces in Green are large banks, but there's no evidence of bedding in them. They just look all slumped, except for some little patches every now and then, flat places. And one little spot looked that like it had a dark - block on it or something.

04 11 44 08 CMP Okay, now, let's see, what's next? Man, whoever put that Velcro on there just didn't believe you'd want to use it. Okay, back to the Flight Plan. See what I'm doing. Okay, we got Hartmann and Green. Let's see here; I concluded this one at - at 145. Looks like I'm supposed to take two.

**CONFIDENTIAL**

~~CONFIDENTIAL~~

Day 5

04 11 45 03 CMP Where are you ... catch up in attitude.

04 11 45 20 CMP Descartes. Here we go. And Crozier. Magazine  
Papa Papa.

04 11 45 51 CMP Crozier. Wonder where he's gonna be. Yeah, we  
can catch him. Gonna let me do it on the same -

04 11 46 42 CMP Okay, I can catch her.

04 11 46 54 CMP Best way to catch those would be look up on ...

04 11 47 11 CMP P7, P1, P7, P16, next one coming up, P12.

04 11 47 37 CMP f/8, 1/250. Next - Crozier.

04 11 48 04 CMP Then Ptolemaeus. And I'll need - to get Ptolemaeus,  
I'll need magazine SS. Okay, SS it is.

04 11 52 32 CMP Houston, are you there?

04 11 52 36 CC ...

04 11 52 39 CMP Hello, there.

04 11 52 47 CC ...

04 11 52 53 CMP Okay, every time I try that, it looks like it does  
worse. I don't know what's holding it in there  
this time, I guess.

04 11 53 34 CC And, Ken, ... verify ... Over.

TIME SKIP

04 22 49 16 CMP Okay.

04 22 50 47 CMP All right, Henry. Talk to you in about 40 minutes,  
then.

04 22 51 45 CMP Go ahead.

04 22 52 09 CMP Well, thank you. I wonder how - how that one  
happened. I tell you, it's pretty easy to kick  
a switch when you're rolling around in here. You

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chase a piece of the Flight Plan away from you, or you kick a camera, and - and that's not an unusual thing to happen. I appreciate your telling me about them.

**CONFIDENTIAL**

## DAY 6

05 01 13 00 CMP Boy, I tell you, that solar corona is really spectacular, along with a lot of other things we've seen here.

05 01 13 16 CMP Not long after we had A0 - LOS, I could see the - I could see a - distinct horizon, and for the last 15 minutes, it's been getting more and more distinct. And now I'm seeing a very bright piece coming up. And you can start to see little reflections along the horizon. And we're going to have sunrise here in just a second. It doesn't show any prominences or anything like that; it just shows this huge disk, and it looks like a black-and-white photograph. Now it's getting brighter, and you can start to see your rays that are streaming, and - There it is! Man, that is a bright son of a gun. Whew! Don't want to get caught looking at that guy. Golly. Most impressive.

05 01 14 22 CMP What do I have to do next here? I got to - gonna slide over here. MAPPING CAMERA, EXTEND, but it already is.

05 01 15 05 CMP Okay, at 32:18, I start it.

05 01 17 53 CMP Well, I have to say one nice thing about Mr. Mercer. His filter bag is a useful little tool. It really is.

05 01 19 53 CMP IMAGE MOTION coming ON -

05 01 19 55 CMP MARK.

05 01 20 01 CMP Barber pole's off.

05 01 20 21 CMP MAPPING CAMERA is coming ON.

05 01 20 25 CMP MARK. IMAGE MOTION's coming up. Barber pole plus 1, 2, 3. Barber pole plus 3.

05 01 21 16 CMP Oh, now we're coming up on a challenge.

05 01 22 42 SC (Music)

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05 01 24 25 CMP\* Go one click to the right, one-half second. Stand by. ... Go two clicks to the right, and I'm on one-eighth of a second; 5 seconds to go. Stand by.

05 01 24 52 CMP\* ... the equivalent of 4 minutes on the countdown in the checklist. Stand by for start the ... It's on the solo sunrise - solar corona portion. Requires 5 percent of the DAC film in the -

05 01 25 15 CMP\*\* ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ...

05 01 25 26 CMP\*\* Four, 3, 2 -

05 01 25 35 CMP\*\* Four, 3, 2, 1 -

05 01 25 37 CMP\*\* START. Fifteen seconds, CMC MODE going FREE.

05 01 25 52 CMP\*\* Stand by. CMC MODE, FREE. In 20 seconds, the DAC will go on and remain on until sunrise. The ... will be DAC ... adjust the settings. Stand by -

05 01 26 08 CMP\*\* DAC on. ... setting, this one here. All the way to the clockwise direction on the ... coming up. First exposure will be 10 seconds. I'll call "Start, ..., stand by." Second exposure is 4. And then we ... exposures on the dial of 1, 1/2, 1/8, and so forth. ... will be a second. Stand by -

05 01 26 30 CMP\*\* OPEN; 1, 2, 3, 4, 5, 6, 7, 8, 9 -

05 01 26 35 CMP\*\* CLOSE. Stand by for 4 seconds. Stand by -

05 01 26 38 CMP\*\* OPEN; 1, 2, 3 -

05 01 26 40 CMP\*\* CLOSE. Stand by for 1 second, then one click. Stand by -

05 01 26 44 CMP\*\* OPEN. Go one click to the right; one-half second. Stand by -

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\*Voice played back from portable tape recorder.

\*\*Voice played back from portable tape recorder at double speed.

**CONFIDENTIAL**

Day 6

~~CONFIDENTIAL~~

Page 271

05 01 26 49 CMP\*\* OPEN. Go two clicks to the right, and I'm on one-eighth of a second. Five seconds to go. Stand by -

05 01 26 53 CMP\*\* MARK it. Two clicks to the right and I'm on one-thirtieth of a second. ... to go. Stand by.

05 01 26 58 CMP\*\* MARK it. One click to the right; one-sixtieth of a second. Stand by -

05 01 27 03 CMP\*\* MARK it. ... off and the DAC off ... AUTO. ... on the countdown. ...

05 01 27 25 CMP Okay, we're standing by ... Stand by.

05 01 27 36 CMP Okay, the ... is there; 10 seconds to ...

05 01 27 46 CMP Four, 3, 2, 1 -

05 01 27 50 CMP START the thing.

05 01 29 37 CMP Get all of our dim light things to do out of the way. Now, I am in a forward, oblique attitude. That means I'm flying - just normally now, pitched up like this, ... 3 ... forward. And it looks like I can afford to put my regular film back - magazine Victor back on the Hasselblad. We'll do that.

05 01 31 05 CMP Okay, magazine Victor is out, loaded, and ready. Okay, now I need to know some settings to use it on. That's also a hard thing to do. Now my little photo wheel. I'm on rev - ... the final one. Let me what - look at the revs - 25. This is rev 25.

05 01 32 07 CMP And AOS should occur at 5 - and a half. Oh, man, look at that. Isn't that clever? Somebody really did a lot of good work here. My little photo wheel, I'll put right here. It's on ... Now let's see if we can see some electricity. Binoculars, put up; dark side goes out. Man, that's a super crew - some octopuses that's trying to balance three checklists, two cameras, a photo wheel; take your

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\*Voice played back from portable tape recorder.

\*\*Voice played back from portable tape recorder at double speed.

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sunglasses on and off and not lose them. Well, here comes our old friend King. This time let's look at King out to the north. Seems like I never get set up in time. All these ...

05 01 33 23 CMP

Well, we'll get a good view of King. Let's see what's out this way. There's that minor crater chain, running down to Tsiolkovsky. It's a little bit disappointing. There is nothing you can see from the south of King. Boy, I'd swear we were seeing things when we were down lower.

05 01 34 14 CMP

How about that. AOS will be about 02:13 ... Okay, we can take the dark slide out just to be different. ... off. Sure hope they put the UV transmittance in the right window.

## TIME SKIP

05 02 55 25 CMP

That was a flash. I know it was.

05 02 55 40 CMP

123:07, that had to be below the horizon.

05 02 55 51 CMP

At 123:07, I was looking in an area - Let me see where it started at now. Well, I don't want this to get out, but I think you might - you might make a note that at 123:07, I was looking out the window, and I was looking at the horizon and there was a horizon, and there was a bright flash that I saw. It was below the horizon. Now whether that was - Maybe I saw one of these light flashes that everyone else has been seeing all day and that I have not seen yet, or maybe I saw a flash. I don't know. It was a ..., was a bright flash. It could have been one of these light flashes that everyone else sees. But I'm going to look at this same area again. Now back to the zodiacal light. Blah. Get the feeling I've been all day with my nose pinned to the window. Trying to get these star patterns here ... I was looking at. ... 30938, coming up on T-start. Okay, ... on.

05 02 57 50 CMP

MARK; 6, 7, 38. ... go again. ... Take two pictures. ...

~~CONFIDENTIAL~~

**CONFIDENTIAL**

05 02 59 50 CMP Okay, there's 1 minute.

05 03 00 10 CMP ... seconds to go, ... seconds ... exposure ...

05 03 00 59 CMP Okay, 40 seconds. ...

05 03 01 49 CMP Get the ... Stand by. ...

05 03 02 06 CMP The next frame will be for 60 seconds. ...

05 03 02 40 CMP Okay, ... for 60 seconds. Stand by; ... 60 seconds.  
Stand by. ...

05 03 03 14 CMP ... for 20 seconds. ...

05 03 03 44 CMP Stand by. ... another ... Stand by. ...

05 03 04 47 CMP Okay, stand by. Stand by ... next exposure will  
be for 30 seconds, 30 seconds from start.

05 03 05 40 CMP Stand by. ...

05 03 05 52 CMP ... second exposure. ...

05 03 06 15 CMP ... Stand by -

05 03 06 20 CMP CLOSE. ...

05 03 06 49 CMP Okay, ready.

05 03 07 01 CMP Stand by to close. ...

05 03 07 12 CMP Stand by for the T-64 [?].

05 03 07 42 CMP Ten seconds to ... second ...

05 03 07 58 CMP Ten, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. Okay,  
it's all there. ... Stand by for ... 64. Stand  
by. ...

05 03 08 33 CMP Sixteen, 17, 18, 19 -

05 03 08 37 CMP CLOSE. I'll go back to the ...

05 03 09 12 CMP Stand by for ... 5, 6, 7, 8, 9, 10. ...

05 03 09 44 CMP Stand by ... seconds. ... 8, 9 -

**CONFIDENTIAL**

**CONFIDENTIAL**

05 03 09 57 CMP CLOSE. ...

05 03 10 51 CMP CLOSE. Okay, ... 3, 4 -

05 03 11 01 CMP CLOSE. ... up. ...

05 03 11 16 CMP Okay.

05 03 11 51 CMP One ... 2 ... 26, 27, 28, ...

05 03 12 35 CMP ... 60; 60.

05 03 15 34 CMP ... 35274, 25. About a minute to spare. Good. How did we work out all that kind of tight? Okay. Can't believe anyone would really do this if they were serious about getting their data.

05 03 16 12 CMP Zodiacal light. ...

05 03 16 29 CMP That's probably ...

05 03 17 29 CMP That's ...

05 03 18 46 CMP Okay.

05 03 19 04 CMP IMAGE MOTION ON. There's a barber pole. And it's gray.

05 03 19 19 CMP Okay, we're in attitude at 31:05, and we're supposed to start at 31:12. Oh-ho. Would you have believed all that? MAPPING CAMERA is ON. IMAGE MOTION is going barber pole plus 1, 2, 3. A-okay. Then I guess we're obligated to humor the Flight Surgeon and change the sensors.

05 03 20 07 CMP Oh, very well.

05 03 20 48 CMP And here's a whole lot of those crow's feet patterns over here on the back side just past the terminator. Let's see where we are. One, 2, 3.

05 03 21 49 CMP Holy smoke! That's Mandel'shtam I'm looking at, and from here, I didn't even recognize it, I'm so close, but that's it. And in the floor of Mandel'shtam, there is a definite - there's a definite flow that's along the floor there with another ... flows. There's a definite ridge line there in

**CONFIDENTIAL**

Mandel'shtam. You can see a subtle flow pattern; it runs into the crater. And then in - down in the crater shadow, with the binocs, I can see things I can't see with my eyeball. And I can see that there is a rille that runs down inside that thing; looks like the same sort of thing that shows that flow pattern on the outside that follows that scarp. And here is another band of this thing, and this thing curves around now and gets lost over here. Get a quick pic of that, and that should be 28. I'm using 5.6 and 1/125. Let's see if we can get a picture of that thing. No, I bet I've already missed it. Bigger than life, I let it get away from me. Even a poor camera that automatically set itself would be an improvement.

05 03 23 46 CMP

I crossed Mandel'shtam and come out. The material out here doesn't seem to show - Well, most of these big craters have - have wet pies [?] at the bottoms. They characteristically have something that looks like the little - ripples, concentric ejecta patterns ... the fact that they're small and very limited in duration, vary in size; they just go out a little ways. The smaller craters - actually, their crater count here is much smaller than it is in a lot of places. This is - from a small scale, the crater count's relatively low. There are more of the large craters back here. And we see some areas now where there is just an awful lot of craters, and I'm looking in an area here that I'll get a picture of. We'll call this frame - Oh, come on. Boy, there's not enough room for me and this camera.

05 03 24 59 CMP

Okay; that was frame number 10 of magazine Victor, and that should show a whole lot of rimless craters in a very textured area that's in this large crater rim just to the - just to the west of Mandel'shtam. I guess I'm going to have to knock this off now and go back to the sensors, or I'll have a direct call from my boss.

05 03 26 39 CMP

And we'll be off comm for a minute.

TIME SKIP

**CONFIDENTIAL**

05 04 52 28 CMP (Singing) Bah-dum-bah - There we go. Doo-doo-doo-doo-doo-bee-dee-dee-dah.

05 04 52 35 SC (Music)

05 04 57 43 CMP (Singing) Dee-dum-dum-dee-dee-dum.

(NO COMMUNICATIONS FOR 18 MINUTES)

05 05 16 01 CMP IMAGE MOTION is coming ON. And barber pole went gray.

05 05 17 15 CMP Okay, at 28. That should be 175. It's right ... Sharanov.

05 05 17 38 CMP No, by golly, I bet that's Papaleski. Spencer Jones.

05 05 17 55 CMP Now I get that mapping camera going. MAPPING CAMERA coming ON.

05 05 18 03 CMP MARK. And that's to be - barber pole plus 3. Barber pole, 1, 2, 3.

05 05 18 36 CMP 28? That's 5.6 and 1/125. Papaleski.

05 05 19 08 CMP Floor of Spencer Jones. Okay. Magazine Victor, frame 16, is the floor of Spencer Jones.

05 05 19 52 CMP I ought to be able to get Mandel'shtam out here. There's good old Mandel'shtam again. Now maybe I can get a picture of this thing I was talking about.

05 05 20 49 CMP There's the section and, by golly, it's still - Okay, frame number 20 on magazine Victor is straight down at Papaleski. And that's the one that shows this ribbon of material; looks like a flow front laying down in all this kind of - kind of hilly and pitted material, and it runs right on up, and there's a whole bunch of these little parallel lines right next to the rim on this big crater in Mandel'shtam. And they run right down in there. Let's see, I have nothing to do until AOS. Okay. Except play.

**CONFIDENTIAL**

Day 6

~~CONFIDENTIAL~~

Page 277

- 05 05 21 41 CMP Okay, we're now at - 35, maybe a little  $f/4$ , ... 206. We've passed Mandel'shtam. We're going for - Konstantinov - must be that guy.
- 05 05 22 14 CMP Okay. Frame number 21 is of Konstantinov. And a apparent ridge of mountains that runs out to the north of there, I'll take a picture of that. And that's frame number 22 taken looking north from Konstantinov in what appears from here to be a very subtle topographic high, and that may or may not be the case.
- 05 05 22 53 CMP Okay, coming up here on - here comes Mendeleev.
- 05 05 23 14 CMP All this material on the back here has the same conglomerate mixture. Look at that - Hey, look at that. Okay, there's two at  $f/5.6$ , and we'll take two more at - that was at  $1/125$ , and we'll take two more at  $1/250$ . I'll draw this on the map. That's in the area between Mandel'shtam and Mendeleev. And the reason for taking the frames was this - this beautiful flow that - flow front pattern that comes along here; and it runs right down through a crater right on up the side and out.
- 05 05 24 16 CMP And the more I look at this material, the more I see it has an awful lot of these little flow pockets in it. There are a lot of collapse features like - it looks - I would say a whole large area may have collapsed. You see relatively large numbers of small craters and a generally undulating pattern that covers this entire area. And we're almost up to Mendeleev now, and the material looks a little smoother. It looks like I've got some smooth material that's kind of filled in with a little rougher material. And it looks like, as I look down at it, that - what is in fact smooth just doesn't have as many of those little craters in it. But that's not really the case. The dark stuff has more craggy kind of craters and more linear furrows.
- 05 05 25 24 CMP And here's a picture straight down that ought to illustrate both kinds, if I don't get too much window in it. We're coming up now on Schuster. Schuster doesn't look particularly different than

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~~CONFIDENTIAL~~

Day 6

anything else. This whole area over here to the north of Schuster - is just like all this back material. It's got craters in it. I have the distinct impression that the small-crater population is less. And the larger craters are all subdued. They have no significant rims to speak of. And maybe the real big ones have mud pies in the bottom, and the mud pies all have little holes in it. You'd swear that bubbled up and just went pop, and all the little bubbles burst, and they collapsed and are very thick. This is typical.

05 05 26 28 CMP

I'm taking a frame now. Okay, that's frame number 28 on magazine Victor, and it's looking down into one of these typical cone craters. I'd say the depth to diameter is about one-half. There are a few of these bright ray craters on the floor of Mendeleev, but actually remarkably few. And the ones that I see - don't seem to me to be particularly different.

05 05 28 05 CMP

Okay, the large craters on the floor of Mendeleev and the crater chain are coming up. And here's one of these pretty little guys that has a -

05 05 28 22 CMP

A little slump of material that runs out in the crater. The crater chain comes down and doesn't appear to be unusual, and this one place has a little tail that runs out. It runs out into the floor, and there's nothing to say about it except it's very textured, but so is the incrimination - inside of the crater chain. As I look down into the one that's cut off, I can see again a whole lot of evidence of - bands and flows and things that - Just took a picture, that's number 28 of the slump area in the northwest corner of Mendeleev. And you see all those striations that run up there that all look twisted and like they kind of draped and mantled itself over there. I don't see any flow front connected with it, though.

05 05 29 44 CMP

And we're pressing right along. I guess the next little guy we'll come to will be - Vetchinkin should be this one. All right.

~~CONFIDENTIAL~~

05 05 30 05 CMP

Oh, maybe that's still - I'd swear the general impression I have of this back side is that it has a much harder surface on it. And I don't really know why. I'm looking now at - I think I'm looking at Green. And on the northern end of it - north - again we see a lot of material that seems to be striations and streaks that go down over the sides. There's slightly different albedos. Almost everything up here is just a subtle tone of albedo change. But everywhere you see an albedo change, there is, in fact, a nice demarcation that goes with it. And I'm going to get one here that's on the crater rim.

05 05 31 04 CMP

That picture is number 30 and it is just to the west of - of Green. I'll have to stop here for a minute and see if I can get a better focus on these binocs or find out what's fogging them. Oh, somebody put their finger on it. Oh, my, Casper, you've done it again.

05 05 31 51 CMP

I thought I had a bad eye on it; wasn't about to admit it. Somebody's put their finger on it.

05 05 32 24 CMP

That does help. One should remember to use good optics. Okay, what have I got in the Flight Plan? AOS here at 48. Okay. I can look north from - Let's see - I need about an f/11 here. Oh, no. Last picture may have been out of focus a bit. Oh, look at that little beauty. Isn't that pretty?

05 05 33 07 CMP

Okay, those are two pictures, numbers 30 and 31, taken north at about 125 degrees, so that's - Well, what are those craters' names?

05 05 33 33 CMP

And I can't tell what they are. They're off my map here. Here comes King in all its beauty and splendor. This time I'm not going to get trapped looking down inside it except for one little look - now that I got the binocs cleaned off. Beautiful! Big improvement!

05 05 34 04 CMP

The things that look like outcrops in the northern flow walls - got all these little fingers, these little white things that stick out there. And I don't know that I really see outcrops.

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05 05 34 29 CMP

Oh!

05 05 34 44 CMP

What I do see are the same old globs of material that cast shadows - that are just like the ones on the central peak. The dark material in there does seem to be mantling over the top of the white. There's no question in my mind about that. And it forms a lava - let's say it forms a pool, and the dark material does in fact lay right on top of that bright white stuff. Well, let's see if we can look out to the north here and catch some more of that line of things that runs out of there. Well, there's an interesting thing; let's see what that is. Holy smokes! Ahhhh! Beautiful!

05 05 35 34 CMP

That's frame 34, and that's on this big crater to the north of King, and it's a beautiful little crater wall in the side of this big crater, and it's got some black material that looks like it's just oozed out of the bottom of it. It's running right down the side. It's really something. The first - It's really dark material on really white sides. Haven't seen anything like that anywhere up here so far. You see little splotches of material, but this is just really spectacular. This is not slumping - Let me verify that I got the right setting on that. I sure don't want to mess that one up - f/11, 1/250.

TIME SKIP

05 06 49 29 CMP

Okay. That now, we got to take a - -

TIME SKIP

05 07 04 36 CMP

Okay. Who stole the window shade? Lock all the doors until I find the window shade. Nobody leaves the room.

05 07 13 29 CMP

Okay, the boom's going out on the gamma ray. It'll be for 14 seconds.

05 07 13 41 CMP

And it's OFF.

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05 07 14 20 CMP Okay, IMAGE MOTION is coming ON -

05 07 14 22 CMP MARK. Barber pole.

05 07 14 28 CMP Now it's gray. LASER ALTIMETER is ON -

05 07 14 36 CMP MARK.

05 07 15 58 CMP Okay. MAPPING CAMERA is coming ON -

05 07 16 12 CMP MARK. And this one is supposed to be at barber pole plus 4.

05 07 16 31 CMP Barber pole, 1, 2, 3, 4.

05 07 16 49 CMP Okay, MANUAL and WIDE, PAN and ZERO. High gain.

05 07 17 22 CMP That's ... out there on that boom. Let's see where it is.

05 07 18 16 CMP Okay, the gamma is out 15 inches.

05 07 18 35 CMP Okay, and I've got an orbital science at Kapteyn - 127:50.

05 07 19 21 CMP ... hold that right there ... map ... over here ... worry about Kapteyn.

05 07 20 12 CMP ... Kapteyn.

05 07 20 23 CMP ... right now - .32.

05 07 21 31 CMP Now look at that - my imagination. I don't think so.

05 07 22 00 CMP Coming over Chaplygin.

05 07 24 06 CMP Oh, there's good old Mendeleev again. Schuster - and on Schuster, it - all this stuff just looks like it's been plastered over.

05 07 24 59 CMP Oh, look at that pretty crater chain. Cuts right through there. ... Hey, that looks like that there's lava flows here.

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- 05 07 27 12 CMP Down along the margin in the bottom of Mendeleev, there's - some of the dark materials that are out there. They've all got this little textured slope to them. Really, I think that's about all you can say for it is that it's just textured. It's very strange.
- 05 07 27 51 CMP You don't want to call them flow fronts, and yet there is definitely a margin. There are two different - distinctly different units, but whether they're just - part of it's consolidated and part of it's talus, it's very hard to discern. The central peaks and all these things - everything back here's been mantled, it looks like. Even the things that are relatively sharp. There are sharp features back here.
- 05 07 28 38 CMP Quite a few very sharp things, as sharp as things in the front. Everything in here has just been mantled.
- 05 07 29 39 CMP I'd say that there's nowhere near the number of craters out here that there is on the front side on the - There are nowhere near as many sharp ones. There's an awful lot of - constructional things and there's some tremendous blocks up ar - around this one back here. Just blocks all over the place, around and on the outside, and then this big mud pie that just oozes up inside. It looks like it might even carry through on the flanks.
- 05 07 30 35 CMP Must be coming up on King. Sure enough.
- 05 07 30 45 CMP Gonna be hard pressed to see very much of Kapteyn on this pass. No, we weren't talking about Abul Wáfa either. It's north of Abul Wáfa. It's more like in the area - I got to get me a new set of coordinates. And there's - that ought to be Chaplygin. No, what's the name of that thing? Lohse [?]. How about that.
- 05 07 31 59 CMP Well, Lohse has an awful lot of boulders around it, just an awful lot of big blocks - on the flanks - plus a lot of - an awful lot of big boulders inside.

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05 07 32 31 CMP

The boulders around the flanks are very impressive. They've got very short - if that's an ejecta blanket, it sure is a short range thing. It's got big clods all around the outside. All up and down inside, there's big clods on top of those things. And it looks like the ground is just slumping in big concentric rings. I wish I could get closer to see that piece up there. That's really interesting. My first chance to see some - a piece of crater forming - going out. Apparently, that place just bends and goes right down in there.

05 07 34 46 CMP

Now there's something that sure looks like leach, swirls, what have you. I'm going to take a picture of that guy. It's - let's see, it's now 127:46, I mean, 11 - Where did my camera go? You go at the time I want to take a picture. Come back here, you. In there with the urine bags. What a place for a camera. 500 - Okay, that's frame 38 on magazine Victor. That's taken looking straight down at a place about - well, let's see - Could that be Abul Wafa there, maybe? ... find King. I've just passed King, so it must be -

05 07 36 52 CMP

Roger, Stu. Be with you in just a minute as soon as I find out where I am here. I just took a picture and now I don't know how to tell you where I am. It's really bad when you switch from window to window to try and figure out where some of these things go to.

05 07 37 53 CMP

Okay, Stu, I'm - -

TIME SKIP

05 09 02 34 CMP

(Humming - "Got to Travel On")

05 09 04 16 CMP

Boy, is that water good. Umh. That's really super. That's as good as a martini. Almost.

05 09 05 01 CMP

Oh, hey. There's something I can do. I'll be a regular little pig. If you've seen one pig, you've seen them all.

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05 09 06 30 SC (Music - "Pink Panther Theme")

05 09 07 06 CMP (Humming)

05 09 08 43 CMP (Humming; snapping fingers)

05 09 11 29 CMP (Humming)

05 09 12 08 CMP Okay, MAPPING CAMERA to OFF. ... 30 seconds, go back ON.

05 09 12 34 CMP Asked them not to write two things on the same line.

05 09 13 08 CMP There's barber pole and 1, 2, 3, 4. Comes OFF. Now we ... 30 seconds.

05 09 13 32 CMP (Humming)

05 09 13 51 CMP Okay, now I'm on the STANDBY. IMAGE MOTION comes OFF.

05 09 14 03 CMP It's OFF, and we're going back to fine on the camera.

05 09 14 16 CMP Okay, Pink Panther, you'll have to wait.

05 09 14 37 CMP Let's see. Set the ... MANUAL and WIDE, plus 10 and 0. Get my binoculars, my camera, trusty long magazine ... No, I haven't got that many.

05 09 15 45 CMP A fourth of the frames to go. Adjust ...

05 09 16 08 CMP Okay, I guess it'd be about 5.6 and a 1/125 coming here.

05 09 16 29 CMP Well, for about 6 or 7 minutes - Well, here we go again. And this is Mandel'shtam I'm coming up over. I'm starting to recognize these little guys, and let's see if we can get back down into that area that was interesting in the crater floor. Well, start ... Well, this isn't a good time to look at that; it's a good time to look at the - at the subtle characteristics of this highlands material out here. What are the general characteristics of the highlands as seen ... the floor? Well, in Mandel'shtam around this central crater, the center

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one, it looks to me like there are at least two different types of material. There is the type of material that surrounds it that looks very, very hummocky and all filled with lots of - of craters, but they're all rounded craters, no sharp rims. I guess that means they're all rimless, really. And outside of that is an area with a - with a lower concentration of large craters - and maybe a little higher concentration of small craters. And on one piece of it, it's obvious that there's a flow that demarcates the difference between them.

05 09 18 17 CMP

But there are places where this flow appears to have nice margins, and then there's other places where it gets covered over by things that are not so obvious. The flow front comes out the - it overlaps itself in places, and tucks underneath and disappears, then comes out the other side. And over here a little farther, it looks more like a wrinkle ridge - from the way it stands up.

05 09 18 57 CMP

I'm looking at the central peak in one of the subsidiary craters - far one on Mandel'shtam. And it again shows very nice stratification just like all the other places we've seen on the Moon - stratification which more than likely does not exist, just because it seems to be everywhere. Everywhere you look, you have the impression of - of lineaments. And they're generally in a crosshatched patched pattern. They go in all kinds of directions. Looking down at some very smooth places, there's places in here that are very subtly separated. They're very smooth, and then there are - there are places that are pockmarked, and they look like Cayley. And the parts that look like Cayley look like the same Cayley that you see on the front side. The smoother stuff is lighter, and I'm trying to pick out what it is that makes the difference. I think the difference is what I think looks like Cayley and what doesn't is more than likely just the absence of many sharp small craters in the lighter material.

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05 09 20 52 CMP

There are places where it looks like it's been overlain by something, and it has the same appearance as the ray patterns do - the ray structures. And now I'm looking at a real old subdued crater; I'll have to look at my map here to see which one this is. You can just make out the outer basin on it, and I think at low Sun, it'll probably stand out. It's just to the - just to the east of Mandel'shtam - correction, just to the west. Now, there's a faint little interesting feature. I'm looking at a ridge - with its scarp going into a downdrop to the - to the east - correction, to the west, between two craters. It comes along, and it becomes a little scarp, and now the scarp completely goes south and drops down to the - to the west. They both lead into a crater. It's - These little features show up all over this area. They look like the things on the mare, except they don't seem to have nearly as much pattern to them. The color of the Moon back here, by the way, is changing now. It now appears to be gray to me rather than - than the brown that we were looking at the first day. That can partly be due to the fact that I'm looking through a different window, which may have different transmissions, and partly it could be caused by the Sun angle changes. I'm just not at all confident, but I know - it's hard - Here again, I can't get any direct Sun on my chart to compare it with, but it has more of a grayish tint now. Well, 17 still lines up, but it looks to me like 19 is a closer match today; 7 is too gray, 8's too gray, 9 is a pretty good match.

05 09 23 09 CMP

Well, I don't have any direct sunlight on my wheel. It may be off at - Let's see if I can get some direct sunlight on it through this other window now. Looks like somewhere around 8; maybe a - 7 or 8. It doesn't match any of these things. It's always off a little bit. Everything you have up here. It's very frustrating. You'd think it ought to agree, but it doesn't. It's like a lot of tests; you can't tell when you're on, you can only tell when you're off. It looks like it might go somewhere between 8 and 9 when I hold the lighting card in the - in the shadow of the spacecraft. It's somewhere between 8 and 9, and I get the impression - I'm gonna try the tans and see how they do. Well,

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they don't do so badly either; it's 14 - nope, that far off. And the one we picked yesterday was 17. That was in the direct Sun, and that's - I think that makes a difference. I think these colors lose their - some of their vividness when they get in bright sunlight. Okay. We're now coming up - Let's see, time for a camera change to -

05 09 25 02 CMP

1/250, f/5.6.

05 09 25 27 CMP

And where should I be?

05 09 25 39 CMP

It's kind of frustrating out this window that features the size of Mendeleev at attitudes we're flying just - just aren't good for viewing. When we had that north oblique and the forward oblique, you could really see what you were doing, and it was nice. Here I am coming over Mendeleev, and only because you know where you are in the sky does it become a meaningful thing. I actually prefer looking out of - out of window 3, even though it isn't looking straight down so much. It's very difficult to tell which way the groundtrack is going at times. I'm now looking at the highlands material to the west of Mendeleev and Hartmann and Green. And one of the first things that you can say is there are no of these elongate kind of craters. Now there are some crater chains, but the elongate things are not there. Everything is generally the same color here. Very, very little color difference, although there's some very light material that you'd call white. But most everything has the appearance of just having been covered over. When I look at it through the binoculars in this area, the - this material is - does not seem to have that many craters and has this - this batched pattern everywhere - on the inside of crater walls, on the flat floors and everywhere I look. It's the same thing down low. There are relatively few bright halo craters. Most of the craters are - even craters that have rims - are indeed rather subdued. They just don't show up very well. Now, there's a nice scarp running - concentric with nothing that I can see. I took a picture of it; you'd never find it on the map. It's just a - it's just an interesting little thing that happens to be down there.

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05 09 28 39 CMP

You can see subtle expressions of it running along for a while, then it goes away. Okay. If I look way up to the north, that must be - oh, with that stuff in it. I think one of those beauties up there has got a big splash on the side of it. We're coming up on King and Ostwald. And the terrain around here doesn't look that different. You could really say all this stuff was covered with snow, and that would - that would be a very reasonable explanation for the - for the way it looks.

05 09 29 35 CMP

I think that's exactly what it all looks like.

05 09 29 46 CMP

And the third one; there's King and then one, two, three craters up to the north - It looks to me like this stuff along the - the - the easternmost of these two tails that come north out of King, which is - has the whitest material around here, that - that stuff that runs along a - a topographic rise, looks like a plateau, and then this plateau sort of drops off as it goes over. There's a couple of craters - I just get the general impression that these things drop off as they go along. Everything around King has these same lineations running - right now they're running generally - generally radial to King.

05 09 30 53 CMP

All these black things that are in there - along those little white peaks in the northern end of King - are places where there's boulders and things that are sticking out of the sides - the same as we see in central peaks almost everywhere else, except here there seem more of them along the walls. On the western wall, those just seem to be places where the residual material is hanging out, sticking together consolidated. I think this is all slumping. You can see places where there's a - looks like a piece is pulled out of the side, and there's a lot of slump down below it. Then there's big pieces that have seemingly resisted. Then on the - out on the western rim, there's one of these real white spots, just a different color. The floor is not that much different in texture, but it's just a real different color. As I look north up along those rays, it doesn't look any different. You don't get any more impression of anything than you do by looking

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at the photographs we have. Now the thing that I do see as I look to the north-northwest of King is that, going up towards Sir Don [?] Rille, we see a - another large crater here, very subdued, and - all along its walls are these places where it looks like something is draped; and I'm trying to figure out now whether that's slumped down or splashed up. I can see the margin - and I just can't tell which way it's going. Apparently, those are slumps coming down. That seems to fill all of those craters along there, and - and the demarcation without the binoculars makes it look like they're sliding up the sides of - of the craters, and with the binoculars, it looks like maybe they're - coming down the sides. And you see a lot of these very light, bright patches, and you don't see that in the highlands material anywhere else. And now I'm looking at these things that look like exactly swirls. And the material has - from this angle, it looks like nothing but coloration; no other differences whatsoever. Except there are places where I know some of these swirls do indeed have - have topographic expression; I can see that. But then there's other places where it looks like the swirl is just sort of a coloration that's on the surface. The general texture of this material hasn't changed any, the albedo hasn't changed a great deal, but the color has kind of darkened a bit.

05 09 34 13 CMP There's the old Earth, and why don't I have a signal? In WIDE, MANUAL, HIGH GAIN, POWER AMP's on. ...

05 09 34 42 CMP There they come. I think they've been sleeping. Come in, Earth.

05 09 35 24 CMP There we - Oh, well. I almost had a lock on that thing.

05 09 35 51 CC Okay, Casper; Houston standing by.

05 09 35 56 CMP Hello, there.

TIME SKIP

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Day 6

05 10 46 22 CMP Okay, waste water dump. The potable is full; the waste is about half full - 40 percent. I think - 8 minutes. I'll set the clock for 6.

05 10 47 08 CMP There it goes. Gurgle, gurgle, gurgle.

05 10 52 04 CMP Ugh. Come open, you son of a gun.

05 10 52 51 CMP Oh, man. You son of a gun!

05 10 57 05 CMP Oh, that's explains it.

05 10 57 16 CMP It's not my imagination. Everything does float up.

05 10 58 40 SC (Music - continuous for approximately 22 minutes)

05 11 03 11 CMP (Humming)

05 11 03 30 CMP (Humming)

05 11 12 36 CMP (Singing) Ta-ta-ta-tee-tum. Ta-ta-ta -

05 11 13 59 CMP (Humming)

05 11 20 29 CMP ALPHA particle COVER coming OPEN -

05 11 20 33 CMP MARK. Barber pole and gray.

05 11 22 55 CMP It looks like Hiyarama [sic]. It couldn't be there. Hiyarama's way over here. It must be Schuster.

05 11 28 00 CMP Well, there are, indeed, little particles flying along with us.

05 11 28 12 CMP That must be Tsiolkovsky over there - the chain that runs down to it.

05 11 28 44 CMP There's another one of those little particles.

05 11 31 40 CMP Okay. Looking back to the - the south and east - at the central peaks of King, I would say that they do indeed have dark material and blocks all along the side, that they're equally as jagged as the ones on the other side. That is not a Sun effect. They're not shadows; they're real. Set that on about the - 11 at 250. Take one of that. Okay,

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[REDACTED]

frame number 39 on magazine Victor is - Okay -  
looking back - dark material on there.

05 11 32 55 CMP Hello there, Stuart.

## TIME SKIP

05 23 07 29 CMP Sixty. ...

05 23 07 46 CMP Another one we sneaked by.

05 23 09 52 CMP ... now.

05 23 10 08 CMP Thirty-six. .

05 23 10 27 CMP Okay, now this little terminator should be out  
here at 60.

05 23 10 38 CMP Must have been Mandel'shtam I was looking at.  
Yeah. That would change ...

05 23 11 09 CMP Okay, and the lighter areas seem to have fewer  
craters.

05 23 11 20 CMP Almost all these craters in the - let's see, can  
we say that the - I see no elongate craters at all.  
I'm just looking in the area just past Mandel'shtam.  
The dark areas seem to have more craters and more  
small craters. The light areas have - not so many  
craters.

05 23 12 02 CMP Some bright halos and dark ones. And the darker  
areas look like Cayley, don't have as many bright  
craters on them, as a matter of fact. Let's see,  
can I - Yeah, there's one bright-rayed guy on -  
another Cayley type. Most of the Cayley types  
seem to have dark craters - generally rimless.  
Everything here is still - On the small scale, we  
have circular craters; on the large scale, we have  
crater chains and - and lineaments - they're on a  
very large scale. Both ... certainly.

05 23 13 11 CMP Now, there's places out here in this Cayley now  
where you find smooth areas that interweave with  
the - the more pitted areas. Then these smoother

[REDACTED]

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bands seem to be just like these thin bands at ... Then some of these bands seem to cross both the white and the Cayley-looking materials. Now then, here comes - this must be Mandel'shtam that I'm coming up on now.

- 05 23 14 06 CMP No, I guess not. Rather, this must be - our old friend, the Cayley floor.
- 05 23 14 40 CMP That stuff is all so subdued, it's just like someone stretched a cold cream over it up from underneath to hide it. Like it was a thick paint, and it - it just barely reflects all the things that are underneath it. And every now and then there's a little old bubble in it that popped.
- 05 23 15 14 CMP As I look out to the south, I still see more and more of that same sort of thing.
- 05 23 15 35 CMP See Chaplygin on the horizon there, and it's got - you can even see from here the - the bright rays that are splashed -
- 05 23 16 33 CMP Okay; I'll come back to all these things. I'm gonna eat chow.
- 05 23 17 49 CMP Red filter.
- 05 23 22 07 CMP Boy, talk about being a creature of habit. Look at everything right side up.

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Day 7

DAY 7

06 00 59 48 CMP ... reason not to wear this hat ... thing. Okay,  
I want to go magazine Papa Papa.

06 01 05 16 CMP (Sneeze) Excuse me. Mmm.

06 01 05 41 CMP Okay. IMAGE MOTION coming ON -

06 01 05 43 CMP MARK. Barber pole.

06 01 05 49 CMP And it's gray.

06 01 07 28 CMP ... on at 19.

06 01 07 58 CMP There's the barber pole; 1, 2, 3.

06 01 08 12 CMP Intervalometer; coming.

06 01 09 32 CMP Partly blank.

06 01 10 43 CMP 106.

06 01 17 49 CMP Well, the outer flanks of King look exactly like  
the central peaks in their characteristics.

06 01 18 12 CMP The old Sun angle comes down, you start to see  
more and more features around King's rim. This  
real white stuff looks like it's all streaked  
flow. It's hard to tell. Right now it looks to  
me like maybe some of these pools of things -  
they've got dark blocks in it and a lot more  
ripples. And it almost looks like that white cliff  
to the north had material flowing into the pool,  
rather than vice versa. And yet the stuff in the  
pool looks like it's flowing down and lapping into  
the crater itself. That pool of material runs out  
to the north. And this time, we'll try to follow  
some of these things out. The terrain out here  
doesn't look significantly different. It all has a  
somewhat radial pattern leaving King.

06 01 19 28 CMP You sure can't see any here yet, the very subtle  
expression that runs up. These slumps that I  
talked about yesterday that are out here in the  
crater just to the northwest look like they emanate  
away from King, like they maybe rushed up the side

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of this - of this cliff in this old crater. I'm not sure if that's the true interpretation, but that's the way they appear. The one that I find that's so dramatic and startling - is this blob on the side. I'm gonna take a frame of Papa Papa of that anyhow. Now where did it go? Come here, you. That is really an impressive thing.

06 01 20 31 CMP

There's some blocks of material on the wall and some blocks in the center.

06 01 20 46 CMP

Let me get a picture here of the center, one out here of the wall feature, one of the rib feature. Okay, that's three pictures on magazine Papa Papa. They go up to 65. And that - that crater is really different, in that - that one outcrop, that outpouring. It's got a very dark band of material that hangs down from it. It's got another lighter blob running down that looks dark, but it's not as dark. Around the very upper crest, you see the same evidence of dark material that you see around the sharp crests of most of these big craters.

06 01 21 42 CMP

Ah, the good old Earth. And in this - this little area here where it has - this bright splash going over the sides -

06 01 22 12 CMP

Doesn't seem to have hi - has hills that look like King. And you find all these color variations up here; they're really associated with the craters for the most part. They look like swirls, but they really are associated with craters. Now I think that I'm looking at right below me - stuff like just very light, dusty patterns that are laid out on the surface that really aren't associated with swirls or any such thing.

TIME SKIP

06 02 30 01 CMP

By golly, I did clean my sinuses out. (Laughter)

06 02 30 15 CC

Casper, Houston. Do you read? You are looking at LOS, and we'd like you to verify the DSE after LOS.

06 02 30 28 CMP

Okay, Hank. Will do.

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- 06 02 32 18 CC Casper, if you still read, the Surgeon says you got your heart rate up to 90, now.
- 06 02 32 24 CMP (Laughter) Doesn't look to me like you got above about 70.
- 06 02 32 40 CMP According to that theory, the hardest exercise I've done during flight was lift-off.
- 06 02 33 01 CMP Hank, according to that theory, it sounds like the hardest work I've done in this flight was lift-off.
- 06 02 33 11 CC (Laughter) Roger. Hey, INCO says he's going to take care of the tape recorder, but you might ought to verify.
- 06 02 46 53 CMP ... supposed to ... But - don't care about that.
- 06 03 09 18 CMP Okay; I'm looking down at Mendeleev again, and - guess one of the things that I'm starting to notice is that - in this outer rim up here, we have a - a fairly smooth, Cayley-like looking material. It's the same as what's down on the floor. Then we have what looks like an old slump material. And on the outside of this smooth Cayley that's at the top, looks like more smooth material. It's non-pitted, which means non-Cayley. The margins of all this stuff are all very, very indistinct. Just can't see anything. There's no flow fronts, there's -
- 06 03 10 20 CMP They just come together. You can see where the break is, and it's just exactly the same way it looks down there at Stone Mountain. It just isn't obvious where one unit starts and another one stops. It looks like mare material to me, but with - without the grabens and without the wrinkle ridges and with probably a larger crater count in general.
- 06 03 11 35 CMP I'm looking at that big chunk in the wall where it looks like something else has run down inside. And when you get up and look at it up close, it all looks the same. You don't see that something else. That's - that's a subtle textural difference. That little area has a lot more pits, and there seems to be a lot more slump. I can look back in the

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Day 7

shadows with the binoculars, and I see a lot of what looks like unconsolidated material. It just sort of looks like mud that exceeded its angle of repose, all slumped in there. There are craters in the walls of this slump material. Some look like they're pointing down, some like they went into the sides. Around the top, it looks like another highly cratered area. As though this top portion may have been a - a crater all its own, just like the one next to it. And then whatever dropped in this big event created Mendeleev, just sliced it off. But throughout it all, the only thing I see that's different from one place to another is just the amount of - of pockmarks that you see on these surfaces. They're all cross-hatched, and thatched, and some of them show - there's one here that shows a little bending. When you look down on it, they look like nice sharp lineaments, but, boy, when you get down and look at them in detail, they just lose all that sharpness completely.

- 06 03 14 07 CMP Why, it looks just like soil that's been torn up.
- 06 03 14 54 CMP Mostly the back side is - is characterized with an absence of blocks. It's really devoid of constructional features. King is a - a markedly different feature than everything else we've seen. Most of the things I've seen have been up to the north. That little crater that's coming up - coming up to King looks like it's got this same material that looks like it's emanating from King, but now this stuff is coming down from the south; that may be ray material from Bruno. And I'm gonna get a picture of this little guy, because it's -
- 06 03 16 02 CMP Oh, that thing is probably gonna be too hard to get to. Doggone it. There it is. It looks like a baby King.
- 06 03 16 26 CMP That one was number 43, the magazine Victor.
- 06 03 16 41 CMP Now I'll get a good picture of the outer materials of King; this is typical sampling. Here's a good picture of that northern rim. Looks like this stuff to the south looks very much like a flow that comes out from King. And the south midwest

**CONFIDENTIAL**

looks very much like the material that's oozed out. All the material that's going out to the north - I mean, that's the south and east - all the material that's going out to the north and east has that same characteristic. There's light material that runs through there and seems to be running through - almost without any kind of rhyme or reason, go through the walls and out onto the ejecta.

06 03 18 00 CMP

Whole area looks different than most other places around here. Now, some of this stuff that I'm calling ejecta - I'm gonna get a picture here of what it looks like as it goes up on the rims of this adjacent crater. And looks to me like it splashes up onto this other crater, as though it all came out in a big surge. I'm not sure that's a reasonable thing to be saying. This series of King ends with frame number 50.

06 03 19 20 CMP

Well, I'll be darned. That looks - that's even different than I thought it was before. Here I got this crater that goes from the top of Guyot down; then this black stuff comes down; then all those striations around there make a pattern that swirls and curves with it. I'm gonna have to draw a sketch of that, because I'll never be able to describe it in words. But it does indeed run right down the walls. That's really beautiful. And there's old Mother Earth. Man, that is a beauty, too.

06 03 20 23 CMP

Never get tired of watching earthrise.

## TIME SKIP

06 04 36 13 CMP\*

... It's on the solo sunrise - solar corona portion. Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the count-down in the checklist. Stand by for start ...

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\*Voice played back from portable tape recorder.

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**CONFIDENTIAL**

06 04 36 51 CMP\* Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ...

06 04 37 16 CMP\* Four, 3, 2, 1 -

06 04 37 20 CMP\* START.

06 04 38 06 CMP One-half, 1/8, 1/30, 1/60; 4 seconds, 1 second, ...; 10 seconds, 4 seconds, 1 second ...

06 04 38 42 CMP One-half, 1/8, 1/30, 1/60.

06 04 48 15 CMP (Cough)

06 04 50 31 CMP (Singing) Dee-dee-dah-dum. This darn spacecraft is really cooler ... is.

06 04 52 05 CMP ...

06 04 55 23 CMP\* Fifteen seconds, CMC MODE going FREE.

06 04 55 37 CMP\* Stand by. CMC MODE, FREE.

06 04 55 48 CMP\* In 20 seconds, the DAC will go on and remain on until sunrise. That will be DAC ... adjust the settings.

06 04 56 07 CMP\* Stand by.

06 04 56 09 CMP\* DAC on. I got the EL camera. Verify that it ... to the ... exposure ...

06 04 56 45 CMP ... be 10 seconds. ... Stand by.

06 04 56 54 CMP\* One, 2, 3, 4, 5, 6, 7, 8, 9 -

06 04 57 03 CMP\* CLOSE ... 4 seconds. Stand by. ... 2, 3 -

06 04 57 11 CMP\* CLOSE. Stand by for 1 second. ... Stand by -

06 04 57 18 CMP\* OPEN. Go one click to the right, one-half second. Stand by -

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\*Voice played back from portable tape recorder.

**CONFIDENTIAL**

06 04 57 27 CMP\* OPEN. Go two clicks to the right and I'm on one-eighth of a second. Five seconds to go. Stand by -

06 04 57 37 CMP\* MARK it. Two clicks to the right and I'm on one-thirtieth of a second. Five seconds to go. Stand by -

06 04 57 47 CMP\* MARK it. ... to the right, one-sixtieth of a second. Stand by -

06 04 57 57 CMP\* MARK it. The EL camera off and the DAC off. CMC MODE, AUTO. ... GET. ... on the countdown. ...

06 04 59 03 CMP GAMMA RAY coming to RETRACT -

06 04 59 04 CMP MARK.

06 04 59 21 CMP IMAGE MOTION going to barber pole plus 4.

06 04 59 38 CMP Barber pole, 1, 2, 3, 4.

06 05 01 32 CMP The GAMMA RETRACT is OFF.

06 05 01 55 CMP Actually, that worked out pretty good. I've never done it without the - without the two ...

06 05 03 33 CMP Okay, STANDBY, STEREO, POWER. STANDBY, STEREO, and POWER. Barber pole and gray. Go to OPERATE at 16:24.

06 05 04 22 CMP ... 8.

06 05 04 39 CMP OPERATE. Barber pole and gray. Now we'll finish up a little sunrise solar corona.

06 05 04 56 CMP Now, let's see, we got a 70 - EL shows 73. DAC shows 82.

06 05 05 56 CMP Eighty-one.

06 05 07 04 CMP That's right. That's supposed to ... seconds before it. ... right.

\*Voice played back from portable tape recorder.

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**CONFIDENTIAL**

06 05 08 55 CMP ... DAC's ... here.

06 05 09 09 CMP And ... POWER, ON. Okay, put the tone booster back on. And we'll check it. [Tone] Oh, there's my ... for the night.

06 05 10 41 CMP Sure would like to have that little Hasselblad. That's a nice camera. Had a real one that you could keep as your own. I like that electric feature.

06 05 13 21 CMP Okay, let's try a little check on the surface polarizer filter. I don't think that'll show me a thing. I think I looked at that once.

06 05 13 42 CMP Now, that's interesting. ... looked at that once.

06 05 22 34 CMP Hello, Houston. Are you there?

06 05 22 42 CMP Oh, just fine. That last sequence worked out just right on the money. Clicked the last frame off, and up came the Sun.

06 05 22 53 CC ...

06 05 23 04 CMP Oh, it doesn't do a thing. There's apparently just a little bit of polarizing done by the windows. And, as I rotate the filter, why, it brightens and dims the scene just slightly. And I checked it against different types of material, the dark - darker materials and the lighter things, and they all seem to respond exactly the same way. I can't see any - I can't see any effects of polarizing from the surface reflection at all.

TIME SKIP

06 10 19 39 CMP Oh, I'll take all the thoughts that you got, Stu.

06 10 19 55 CMP Okay.

06 10 20 07 CMP I'd hardly be the Government's hero if I over-torqued my Dukesons [?] on the rendezvous.

**CONFIDENTIAL**

~~CONFIDENTIAL~~

06 10 20 44 CMP Okay, thank you. Is it that time? It sure is.

06 10 22 14 CMP Hey, you know, I haven't - hadn't gotten around to looking for planets. That's what I was doing the other night when - when things went to worms, and I decided they're probably trying to tell me something. It really is pretty out there, the way you can see all those stars. They - they really stand out. Looks like a planetarium, there's so many.

06 10 26 13 CMP All righty. See you in a little bit.

## TIME SKIP

06 20 41 46 CMP\* This tape can be used in the ... sunrise solar corona ... Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ... Four, 3, 2, 1, START.

(NO COMMUNICATIONS FOR 25 MINUTES)

06 21 07 08 CMP That's getting to my peace and quiet.

## TIME SKIP

06 22 15 59 CMP Okay. I'll see you on the t'other side.

06 22 25 41 CMP\* That's gonna start at minus 3 minutes before sunrise -

(NO COMMUNICATIONS FOR 16 MINUTES)

06 22 41 37 CMP (Sneeze)

06 22 41 53 CMP (Sneeze)

\*Voice played back from portable tape recorder.

~~CONFIDENTIAL~~

**CONFIDENTIAL**

06 22 43 14 CMP ... Just look at that. Want that? Thank you.  
All righty. ...

06 22 44 59 CMP\* - - at minus 3 minutes to sunrise. Fifteen seconds,  
CMC MODE going FREE.

06 22 45 25 CMP\* Stand by.

06 22 45 27 CMP\* CMC MODE, FREE. In 20 seconds, the DAC will go  
on and remain on until sunrise. That will be  
DAC ... adjust the settings.

06 22 45 54 CMP\* Stand by.

06 22 45 57 CMP\* DAC on. I got the EL camera. ... it at the B set-  
ting. ... First exposure will be 10 seconds. ...  
Stand by. Second exposure ... should have been a  
timed exposure ... second. Stand by.

06 22 46 40 CMP\* OPEN; 1, 2, 3, 4, 5, 6, 7, 8, 9, CLOSE. Stand by  
for 4 seconds. Stand by.

06 22 46 54 CMP\* OPEN; 1, 2, 3, CLOSE. Stand by for 1 second. ...  
Stand by -

06 22 47 04 CMP\* OPEN. ... one-half second. Stand by -

06 22 47 13 CMP\* OPEN. ... to the right and I'm on one-eighth of a  
second. Five seconds to go. Stand by -

06 22 47 23 CMP\* MARK it. ... to the right and I'm on one-thirtieth  
of a second. Five seconds to go. Stand by -

06 22 47 33 CMP\* MARK it. ... to the right ... second. Stand by -

06 22 47 43 CMP\* MARK it. The EL camera off and the DAC off.  
CMC MODE, AUTO. ... configure ... GET ... count-  
down. ...

06 22 49 02 CMP\* Okay.

(NO COMMUNICATIONS FOR 11 MINUTES)

\*Voice played back from portable tape recorder.

**CONFIDENTIAL**

Day 7

**CONFIDENTIAL**

Page 303

06 23 00 15	CMP	Oh. Don't stick, BB, please. That sorry -
06 23 01 09	CMP	Okay, now. Exposure wheel, go.
06 23 01 24	CMP	... 48.
06 23 05 03	CMP	...

**CONFIDENTIAL**

1948

1948

## DAY 8

07 00 57 37 CMP SERVO POWER 1, AC1, SERVO POWER 2, AC2. ROTATION CONTROL POWER NORMAL, number 2, AC; DIRECT, two are OFF. BMAGs are uncaged; 2, 3 uncaged. Going to SCS. RHC number 2 is armed. Here comes GIMBAL MOTOR number 1. PITCH 1 -

07 00 58 14 CMP MARK. Good start. YAW 1 -

07 00 58 17 CMP MARK. That's a good start. The trim thumbwheels work - both directions - on PITCH, 7.48, 1.5. I can tell the difference. YAW thumbwheel works in both directions set on plus 1 - 02. Okay. PITCH, MTVC; YAW, MTVC is good. Okay; back to CMC; then go back to zero. Going clockwise. START, PITCH 2. It trims, and MTVC. Back to neutral. I have no MTVC, PITCH and YAW. Then back to zero. ROTATION POWER number 2 is AC/DC. DIRECT number 2 is MAIN A/MAIN B. Let's see. We'll take a maneuver and see if it gives us one. It does not. The gyros - I'll just sort of cage them to bring them up to speed and back to uncage. TVC looks good. ENTER the 204. PRO. It's a plus 2 in pitch, minus 2 in pitch, zero; plus 2 in yaw, minus 2 in yaw, and zero. And it's trimmed. I'm out of 204. The RATE switch is going to HIGH; the SCALE is 5 at 1. The DSE is running. Okay; we're going to terminate 509. That's VERB 48 ENTER, VERB 21 - and I want that to be a 10101. VERB 25 NOUN 7 ENTER, 75 ENTER, 1 ENTER, 0 ENTER. I will now take down the 509 flag.

07 01 01 46 CMP And it's time to strap in my trusty machine. A piece of bread I don't need in my face.

07 01 02 00 CMP Do not yet have YAW GIMBAL number 2 on. But I will bring it on in just a minute.

07 01 02 27 CMP Okay; I'm going to bring YAW GIMBAL number 2 on.

07 01 02 32 CMP MARK. DIRECT ULLAGE breakers are two, in. Okay, we're at 3 minutes and 9 seconds. I'll go to VOX at - 2 minutes. Let's see, it should have Houston here in another minute or 2.

**CONFIDENTIAL**

07 01 03 07 CMP I am indeed going sideways, so I must be doing it right.

07 01 03 42 CMP Hello, Houston. How you doing?

## TIME SKIP

07 02 51 56 CMP That's on STANDBY. No, it's actually FORWARD.

07 02 52 18 CMP ...

07 03 00 57 CMP One, 2, 3, 4, 5. This is a test of the recorder. Over.

07 03 01 08 CMP\* This tape will be used for the solar -

07 03 01 19 CMP One, 2, 3, 4, 5, 4, 3, 2, 1. This is a test of the recorder - recording capability. One, 2, 3, 4, 5. Over.

07 03 01 39 CMP\* Three, 4, 5, 4, 3, 2, 1. This is a test of the recorder - recording capability.

07 03 01 51 CMP That's a way; it works.

## TIME SKIP

07 10 08 54 CDR ...

07 10 08 57 LMP Well, open the inverter breaker - and that's it.

07 10 09 15 LMP Let me have it over here, John, a minute. Thank you. Yeah. It's getting all - there's a lot trapped up in here, and it's getting it all out.

07 10 09 46 LMP Okay.

07 10 10 06 CC Okay, 16, we're about 30 seconds from LOS.

07 10 10 13 CMP Okay. When you see us next time, we'll be ...

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\*Voice played back from portable tape recorder.

**CONFIDENTIAL**

Day 8

Page 307

07 10 10 20 CC Okay, and AOS time, 179:08; and your angles are zero - zero and 170.

07 10 10 30 CMP Okay. Thank you, Jim.

07 10 12 50 CMP Hello. Yeah. I ain't sure where we're gonna put them, but I - I've got them. There's one - Okay.

07 10 13 13 CMP Okay. Got one more glove to go.

07 10 13 17 CDR ...

07 10 13 36 LMP Okay.

07 10 13 37 CMP Okay. Thank you.

07 10 17 51 CDR Get out of your suit.

07 10 17 52 CMP Never put it on. No, I - don't know why. I - decided I didn't need to put it on. It may have - I don't think I've done a thing that was in the Flight Plan, since you left.

07 10 18 08 CDR Really? ...

07 10 18 11 CMP It's really been grim as far as that kind of stuff.

07 10 18 15 CDR I think it's made up - -

07 10 18 17 CMP Yeah.

07 10 18 18 CDR - - ... camera.

07 10 18 19 CMP Hey - -

07 10 18 20 CDR Hey, ... You're in mine.

07 10 18 21 CMP Yeah.

07 10 18 22 LMP It's already in there. Bet you 5 dollars.

07 10 18 23 CMP They've been - they just driving me up the wall. So far, I ain't lost my cool. Which is - for me is very unusual. I think I'm -

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07 10 19 18 CMP (Laughter)

07 10 19 20 LMP ...

07 10 19 39 CMP Yeah, we do need their waist tether. That's one - Okay.

07 10 20 03 CMP Ah. I bet Grumman pays a guy something for a special tool to do this.

07 10 20 26 CMP How come you've been to a - you've been in the minstrel [?], huh? You've been in the minstrel [?]. You look - -

07 10 20 45 CDR Hey, Ken, let me tell you something. After touchdown - ... Ken! ... Right after touchdown, the President's gonna call me... (Laughter).

07 10 21 02 CMP (Laughter)

07 10 21 04 LMP Man, that's really funny.

07 10 21 10 CDR ...

07 10 21 14 CMP Kind of a shame to throw it away, isn't it?

07 10 21 27 CMP Oh, you son of a gun!

07 10 21 45 CMP Ah - what kind of camera is it? What kind of camera you got? Yes, sir. Sure do.

07 10 23 03 CMP Yeah. Throw it. Okay.

07 10 25 24 CMP Yeah. I don't have any place to pulse [?] as yet.

07 10 25 35 CMP Oh. You going to be able to take those tonight? Oh, oh, okay. That's not so bad because I'm sitting here with - with no place to go. I don't - I don't understand the - There's so much bull in there that I don't understand what's going on.

07 10 28 54 CMP Charlie, what piece of gear would you like first?

07 10 29 13 CMP Okay.

07 10 30 06 CMP Okay. What do you want to give me now? The LEVAs?

**CONFIDENTIAL**

07 10 30 37 CMP Be a good way to get dirty. Yeah.

07 10 33 32 CDR ...

07 10 33 38 CMP (Laughter)

07 10 33 42 LMP ... on that total.

07 10 33 44 CMP (Laughter) I believe you.

07 10 34 07 CMP (Sneeze)

07 10 35 24 CMP Can I sell you guys some bags?

07 10 35 44 CDR ...

07 10 35 50 CMP (Laughter)

07 10 35 57 CDR ...

07 10 36 01 CMP I - Have - have they been all messed up with you guys? Man, it's like - it's like they'd never flown a flight before. Like the very first sim. Couldn't believe it. And I kept hoping that maybe you guys weren't getting the same stuff.

07 10 36 21 CDR ...

07 10 36 22 CMP Okay. What -

07 10 36 23 CDR ...

07 10 36 24 CMP (Laughter) That one's not even filled.

07 10 36 30 CDR ...

07 10 36 36 CMP (Laughter) I've been practicing. Here, I'll get the bags out of your way. Trying to get rid of something because I ain't sure where you're going when you get here.

07 10 36 49 CDR ...

07 10 36 50 CMP (Laughter)

07 10 37 02 CDR ... real bad.

**CONFIDENTIAL**

07 10 37 08 CMP What - what are you - what have you got to work with there, John. Okay. I got your - I got your new clothes in here. Do you want them? You ain't gonna get any better.

07 10 37 35 CMP Did you - did you find any big rocks that were con - that were consolidated? Did you find any big rocks that weren't breccias?

07 10 37 43 SC ...

07 10 38 01 CMP Okay. (Laughter) You were what? I feel like - if you want to hand me the probe, I'll lay down here while you get it. We is sort of full right now. I hate to see that thing go. Yeah.

07 10 38 51 CMP Okay. Wait a minute, John. You're hung - Okay. You're clear.

07 10 39 07 SC ...

07 10 39 12 CMP You want a drogue? This is the ... that keeps ... This is - this is a tight fit. Well - -

07 10 39 51 CMP Some smart man just stepped on his own cable.

07 10 40 06 CMP Chas, can I interest you in something else?

07 10 40 57 CMP Well, I guess I'm supposed to take LEVA bags from Charlie.

07 10 41 38 CMP I got one.

07 10 41 51 CMP (Laughter)

07 10 43 16 CMP Are you ready for the decon bags?

07 10 43 35 CMP Okay. All right. (Laughter) No. None of us are going very far.

07 10 44 13 CMP Okay. Let's see. Where was that supposed to go?

07 10 44 44 CMP Here. Here's what I was gonna - Okay. Oh. Okay. I'm gonna have to - I'm gonna have to get under there to get to those for you.

07 10 45 01 CMP The bag is getting - The whole purse? The whole purse? Okay.

**CONFIDENTIAL**

07 10 45 45 CMP

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Okay. I'd sure like to get rid of something out of here. Good grief! Why don't I just - throw that in the corner. (Laughter) We can sort that out tomorrow. Okay. You don't need the purse back, do you? All right. Okay. Seven - 70 millimeter - How about taking this and throwing them to me, and tell me where they go? And I'm gonna - As long as we're throwing trash in there, we might as well throw it all. (Laughter) That'll fix it. (Laughter) Okay. Three of those must go in A-8, huh? Just one of the three.

07 10 48 53 CMP

Okay, you got those 16s? Got another pack like that of 16? You don't say. That's all the film? Sure took a lot more than that out of here.

07 10 49 15 SC

...

07 10 49 27 CMP

Well, it gives them a serial number.

07 10 50 13 CDR

...

07 10 50 29 CMP

What - where do they go, John? Yeah.

## TIME SKIP

07 12 03 20 CMP

... What are we gonna do with our suits now? I hate to waste all the effort to wad them up. How about -

07 12 03 37 CMP

Well, I guess ... We can put a - we can put the LEVAs and probably one of the suits up here and lay the other ones down here athwartships. And Charlie can use his rack, and you can use this one, and I'll use this one. Down here under his three rock bags. I'll get them out tomorrow. I'll get it out tomorrow. I'm not that tired, I just don't feel like fooling with it (laughter). Because whatever they do, I know it's gonna be changed.

07 12 04 25 CMP

Well, I bet you you don't. You know, it would be a - because they ain't gonna tell us. I think about the only way we're gonna get a straight answer out of them is to say, "All right, you guys, now knock that off and tell me what you're doing."

~~CONFIDENTIAL~~

**CONFIDENTIAL**

And I suspect that would - that wouldn't buy us anything. And it would probably upset all the program.

- 07 12 04 54 CMP That's right. Well, I guess I really don't object to that way of operating, as long as I have my day in court when we get back. Jim, did you call?
- 07 12 05 15 CMP We just have LOS? No. I don't know. Got any signal strength there? No? Okay. ... Okay.
- 07 12 05 38 CMP You know, it's a shame you don't get to fly these things more often, because - well, I could do it so much better if I - with some experience. You know, I - now I got some i - up to now, it's been all imagination. And now I got some idea what's real and what's bull.
- 07 12 06 16 CMP Yeah. Yeah, I - There's just so much you could do to make it better. But you can't tell somebody else, because they've got to go through that learning period.
- 07 12 06 38 LMP ...
- 07 12 06 41 CMP Huh? (Laughter) Thirty minutes after the next hour.
- 07 12 06 48 LMP ...
- 07 12 06 51 CMP Okay. I got 180:18. Okay. Well, I guess we ought to go ahead and try to stow those suits somewhere. Wait a minute. Let me make room for it, and then I'll - Hang on a second, Charlie, let me -
- 07 12 07 41 CMP I'll tell you what, John. We could sure put one of these in here.
- 07 12 07 58 CMP Okay, I'll get it. Why don't we just put one of them in there, John? Well, they ain't gonna get any cleaner. I mean - we got to live with this stuff.
- 07 12 09 21 CMP Hey, John, you want to throw these away? You want to throw these fecal bags away? No. Those are brand new. Those are brand new. I don't - it's - I don't know how much you guys have been defecating; I've been - I defecate once a day (laughter).

**CONFIDENTIAL**

[REDACTED]

Yeah. We got - Man, we don't have an overabundance of these things.

07 12 10 03 CMP Why - why don't we - why don't we just keep this?  
Let me keep it.

07 12 11 07 CMP You know, if we just put that one in here - that'll  
be okay.

07 12 12 08 CMP Okay, John, just slide the leg - -

07 12 12 10 LMP ...

07 12 12 13 CMP No, daddy.

07 12 12 25 CMP Okay. Did you just - I am?

07 12 12 43 CMP (Laughter) It's a lot better looking than what's  
supposed to be there. (Laughter) See if you -  
if you perform as well as your outstanding per-  
formance on the ground, or some such bull.

07 12 13 04 LMP Might be.

07 12 13 06 CMP Well, maybe that's what - Those guys are so dinga-  
ling, they might want to see if you really - if  
you do good there - if you really could do good -  
I don't know. I - You got one more suit to go,  
huh?

07 12 13 21 LMP ...

07 12 13 43 LMP ...

07 12 18 15 CMP Tell Charlie it's 30. It's 30.

07 12 18 18 CDR It's 30, Charlie.

07 12 18 37 CMP I sure am impressed with how easy these things  
control. I'm also impressed with how fast the  
fuel goes away. That part of the simulation's  
right. You get rid of gas so fast you can't be-  
lieve it. I - think so. I'm ready to try.

07 12 19 15 CMP Well, I'm sure sorry. I felt like I - I - blew  
that thing. Okay? Make good and sure these  
breakers are in. I'll check that. I'm sitting

[REDACTED]

**CONFIDENTIAL**

here with my hands folded. Okay, I might - Wait, wait, let me see here. Okay, they're in.

07 12 19 49 CMP Okay, have I got it? Still haven't gotten 7 - B. It says I got a volt and a half now. Down to 0.4. Looks like I got all the batteries cycled and stuff. I put it in the top of your - of your helmet stowage bag. Which is - either this one - yeah. The one you just gave me. It's in there. Say again? Yeah. Yeah. Yeah. As far as I know, I do. I'm getting you power some way. That'll be a twist. (Laughter) Well, it's a good way to get dirty.

07 12 21 14 CMP You're right; same old food. (Laughter) I'd recognize it anywhere. (Laughter) I ain't sure where that is. We're at - we're LOS now. Aren't we? (Laughter) ... Yeah. Yeah. Well, once they powered up your loop, why - that was it. Well, I'm just looking for a place to put it, John.

07 12 22 03 CMP Yeah, but there ain't many ways to get to it. I'll tell you what we could do, we could put some rock bags back there for the night. Let me do that.

07 12 22 46 CMP Let's see. I can probably get one more back in here.

07 12 22 59 CMP Well, I'll tell you what I could do is put the - Well, I was gonna say, I'll put the fecal bag back there; but, if I do that, sure as heck we'll need it. I'll shove one more - maybe this guy will go back there. ... he's too big.

07 12 23 53 CMP Ah, no way.

07 12 25 01 CMP Just hold off for a minute. Just hold that there a minute. Yeah.

07 12 26 01 CMP Ah-ha!

07 12 26 26 CDR ...

07 12 26 31 CMP Yep. We'd be jettisoning the LM in another 30 minutes. We'd be jettisoning the LM in another 30 minutes. 175:43.

**CONFIDENTIAL**

07 12 27 03 CMP Okay. John, what I was gonna suggest is, we just crumple this thing up athwartship here. Is that all right? Instead of putting it in the bag? Because we just got to get it out tomorrow morning, sometime.

07 12 27 33 CMP What? About 45.

07 12 27 39 LMP ...

07 12 27 41 CMP No, 180 something. 180 - 180:40.

07 12 28 04 CMP I doubt it. Not when you consider the fact that we got to get - how many hours it's gonna take to get suited up and jettison the LM tomorrow. It's gonna take all day to do that. Well, what do you got to do now?

07 12 28 23 CDR ...

07 12 28 24 CMP Yeah. Let's close up, get some chow, and - Yeah. Yeah, but - let's get that tomorrow.

07 12 28 48 CMP You - Well - Don't hang the DeBakey [?] against the switch panel. Oh, that's what it was. That thing. I knew there was something. Now, where was I? I had a place all in mind for that thing. Figure out where it was. Okay.

07 12 29 39 CMP I'd suggest, if anybody's got to defecate, that you go over to the LM to do it.

07 12 30 26 CMP They get tired. But they're fresh. (Laughter)

07 12 30 52 CDR ...

07 12 30 58 IMP ...

07 12 31 05 CMP Charlie, if you got to defecate or something, I'd suggest you use the LM. Yeah.

07 12 31 14 CMP Well, that's a change. Last time, they let them oversleep.

07 12 31 32 CMP Well, that - that's the name of the game right now. I don't understand it, but that's the way it is. I - I guess I'll just learn to accept that.

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07 12 31 50 CMP Looks like those straps on your - on your right shoulder there are catching, Charlie.

07 12 32 32 CMP Are you gonna scare me again?

07 12 32 45 CMP Yeah. You get - you get colder. Yeah. Okay. Now, babe - for the time being, why don't you lay in my couch here for a minute.

07 12 33 16 CMP Okay, John, just - don't - (laughter)

07 12 33 23 CDR ...

07 12 33 25 CMP (Laughter) I never would have guessed.

07 12 33 37 CMP Huh? Well, I thought we had - thought we had just made our first lunar abort. Yeah. Ever since then, I've had this terrible feeling that maybe they should have aborted us. (Laughter)

07 12 35 14 CDR ...

07 12 35 28 CMP I got the distinct impression they weren't very happy with our questioning. Well, I thought the thing to do was do nothing. You know? Because then if they decide to go, we're probably still not that - we're within phasing capability. If they decided not to go, then we could afford to use the gas. The thing I couldn't see was why we were still questioning and pressing on, and wasting all that gas to accomplish nothing. Now that one really puz - that - On the first rev, that was okay. That would have cost me maybe 50 pounds. Oh, yeah. Well, we almost were. And that's the reason I asked you, "Should I tag up?" And you said, "No." Well, I didn't either. And - no, I - I was just saying, you know, I - -

07 12 36 23 CDR ...

07 12 36 28 CMP You got to phase it.

07 12 36 42 CMP Yeah, but I just didn't like the idea of doing it the expensive way. Brute force is never the way to do anything in a marshmallow. Are you looking for a place to stow that, Charlie? Oh, okay. Yeah. I was gonna say - Hey, there's a - plenty of room down here.

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07 12 37 35 CMP (Laughter) No. I tell you what, for a temporary thing for tonight - down in the bottom of John's TSB over there, I put in those - those two - plastic over - urine overwrap bags; let's use them tonight, and I'll start on the other g - other jettison bag after we get rid of the LM.

07 12 37 54 LMP ...

07 12 38 10 CMP Well, how big a bag do you need for that?

07 12 38 12 LMP ...

07 12 38 20 CMP The DEDA? Did you say the DEDA? Oh. I was gonna say - I wouldn't mind having your platform, but I really don't care about having your - (laughter) Go ahead. Well, here's one we can certainly afford to throw away. That's the most worthless piece of junk. Yeah, it does spin, but that's all it does.

07 12 38 58 CDR ...

07 12 39 01 CMP No.

07 12 39 02 CDR ...

07 12 39 17 CMP What do you say we - we - Well, I'll tell you what I'm gonna do. I'm gonna pump the cabin up and make sure I got a little DELTA-P, and make sure the hatch is - (laughter) yeah. I haven't copied this - this - hour yet. You know - -

TIME SKIP

07 14 02 22 LMP ...

07 14 02 31 CDR ... stuff ... against the wall.

07 14 02 47 LMP Yeah. ...

07 14 02 52 CDR ...

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07 14 03 07 LMP Well, ... when you get - when you get through, you better complain about it because ... you got to get that around ... ...? You'll never believe ... you're practicing.

07 14 04 43 CDR Did you get it?

07 14 04 45 LMP Yeah.

07 14 04 46 CMP If you ... feel like it, before you go to bed, I'll show you something.

07 14 06 41 CDR ...?

07 14 06 42 LMP No, I didn't.

07 14 06 44 CDR ... off. ... off?

07 14 06 56 LMP No.

07 14 07 00 CDR ...

07 14 07 11 LMP I already ...

07 14 07 13 CDR ... all the ...?

07 14 08 04 SC (Sneeze)

07 14 08 27 CDR Okay, ...

07 14 08 36 LMP ... the first one.

07 14 08 44 CDR ... the first one. ... second ... Thinking about all the ... Okay, that's all down. ...

07 14 09 31 CMP ... you can't get - you can't get ... you can do with something. Bunch of this stuff ... 3 days in a row, every hour ... If they ... I got one whole hour. ... think of something. ... eat my sandwich ... records ... Man, I love those ...

07 14 10 13 LMP ...

07 14 10 15 CMP I don't have any i - (laughter) I don't have any idea. I hope not - they don't make this ll against one. He really likes them.

**CONFIDENTIAL**

Day 8

~~CONFIDENTIAL~~

Page 319

07 14 11 03 CDR ...  
07 14 13 17 LMP ... back over there.  
07 14 13 25 CDR Have to do that today. ... Ow! ...  
07 14 13 45 LMP ... last button.  
07 14 14 38 LMP Think it ought to be about ... pounds ...  
07 14 14 45 CDR (Laughter)  
07 14 14 59 LMP I feel like ... on top of ... Any man who could  
do that ... I don't understand ... this stuff  
and ... one on top of the other and then shake  
them up ...  
07 14 15 23 CDR ...  
07 14 16 03 CMP ... Take a look, dad. ... open ...  
07 14 16 17 LMP Well, I ain't sure - I ain't sure that circuit  
breaker was open, you know?  
07 14 16 22 CMP ...  
07 14 16 32 LMP ...  
07 14 17 07 CMP ...

TIME SKIP

07 18 39 02 CMP Isn't that good? Nice and cold?

TIME SKIP

07 21 57 00 CMP So I've deleted all that stuff that's there, except  
for the ALPHA COVER, CLOSE. At 193:46, we'll take  
the MASS SPEC ION SOURCE, OFF, and EXPERIMENT to  
STANDBY. Start our 5-minute time. The gamma ray  
boom gets retracted, the X-ray goes to standby, and  
after 5 minutes, I retract the mass spec boom, and  
the alpha particle cover will come closed.

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07 21 57 29 CC That's affirmative. And then you'll do the - you'll do the PURGE LINE HEATERS, ON, configure for the dump, and the rest of the things there.

07 21 57 36 CMP Okay.

07 21 57 40 CDR Charlie, I - I have no remembrance - -

07 21 57 42 CC And on the next page, at 194:10 - -

07 21 57 43 CMP Hey, Hank - Okay. This - this PGA donning with things going on during it bothers me a little bit. We - this PGA donning in our present configuration is a - is a three-man effort, even if one man's job is just to get in the corner and stay there - stay out of the way. And I'd like for us to do the minimum activity while we're putting those suits on.

07 21 58 17 CDR Unless we could go over in the LM and do it.

07 21 58 19 LMP We can do it in the LM. That might be best ...

07 21 58 24 CDR Ask them if we can do it - -

07 21 58 25 CMP If we can do it in the LM, I guess that'll relieve a lot of the load here.

07 21 58 32 CDR ...

07 21 58 34 LMP That's pretty low signal strength.

07 21 58 36 CC Okay, I guess we're just gonna have to do the best we can, Ken, and we'll try to help as much as we can from down here.

07 21 58 42 CMP Okay; it's not so much a problem entirely of just keeping track of things, but you just - once the guy starts putting that suit on, he commands the rest of the volume in the spacecraft. That's - that A7LB is a real - real interesting operation. If we can use the LM for it, that'll help out a great deal.

07 21 59 08 CC I don't see why not.

07 21 59 10 CMP Okay; we'll plan to do that.

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07 21 59 17 CDR Now, we gonna have the IM - do we have the IM closed out?

07 21 59 19 CC Okay. At 194:10, delete the P52 and - -

07 21 59 22 LMP It'll - -

07 21 59 23 CC - - the "P20; CMC MODE, AUTO; GDC align."

07 21 59 25 LMP It'll be - Oh, excuse me. It'll be closed out, and all you have to do is close the hatch.

07 21 59 30 CC Do the purges and dumps, delete the P30 remark there - -

07 21 59 31 LMP Thank you, John.

07 21 59 33 CDR Want some scrambled eggs, hot?

07 21 59 40 CC - - and, at 194:23, we're going to close the hatches.

07 21 59 42 CMP Wait a minute. Did you say delete the dumps?

07 21 59 48 CC Negative. Do the dumps.

07 21 59 49 CMP Okay. Do the dump with the purge, delete the P52 and the alignment and P30 stuff. And let me write some times on this page.

07 22 00 03 CC Roger. And at 194 -

07 22 00 10 CDR Shh! Look at that!

07 22 00 24 CDR It's cold up in that tunnel.

07 22 00 29 CMP Okay, Hank, go ahead.

07 22 00 31 LMP That's ...

07 22 00 34 CC Okay. At 194:23, we've closed the hatches, and you do the "PURGE LINE HEATERS, OFF," and terminate the waste water dump; and, at this point - -

07 22 00 47 LMP Terminate waste water dump, I think is what -

**CONFIDENTIAL**

Day 8

07 22 00 49 CC - - we're going to jump in the Flight Plan. I think that's as far as we ought to go on this rev. We're about 2 minutes from LOS - -

07 22 00 54 CMP Okay; you're starting to break up.

07 22 00 55 CC - - but, at this point, you're going to jump back to 176:55.

07 22 01 02 CMP Okay; if you'll tell me the time bias to put on that page, I'll have that ready.

07 22 01 19 CC We'll catch that the next rev, Ken.

07 22 01 21 CMP Can you give me the time bias so we can - I can do that - update the times on the page?

07 22 01 29 CDR 21:50, I think he said. Is that right?

07 22 01 34 CC We weren't planning on doing that section. We were just going to do all those steps. There's about 45 minutes of stuff in there getting ready for the jett before we do it.

07 22 01 44 CMP Okay; how about if I am standing by with a blank page and just let you read me a new time line?

07 22 01 56 CC We'll have it ready for you, Ken.

07 22 01 58 CMP Thank you, sir.

07 22 02 18 LMP As a matter of fact, the Sun doesn't sink slowly in the east here; it sinks slow - I mean the west; it sinks slowly in the east. Thank you.

07 22 02 39 CDR Ken, what do you want? We got a choice of scrambled eggs, grits (laughter).

07 22 02 48 CMP What I want is a brand new Flight Plan.

07 22 02 50 CDR Yeah.

07 22 02 51 LMP I'm glad you worked - -

07 22 02 52 CMP ... in here.

07 22 02 53 LMP - - I'm glad you worked that 500 hours on that Flight Plan, Ken. (Laughter)

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07 22 02 55 CMP Man, I'm gonna - I'm - I'm right on the point of going unstable.

07 22 02 59 LMP You poor thing. I really feel sorry for you. I'm kidding you about it, but I - I just - I think that's really not a thing to kid about.

07 22 03 06 CMP It isn't even the right thing to do. You know, it's just got to - -

07 22 03 07 CDR How about a cup - a hot cup of coffee, Ken?

07 22 03 10 CMP Yes, sir, please, and some juice.

07 22 03 12 LMP Watch that water, there, John. That thing leaks hot water.

07 22 03 15 CMP It - No, if you - it leaks and everything. If you keep the cap on it, it doesn't leak. I don't understand why, but it works.

07 22 03 21 CDR Okay.

07 22 03 22 CMP If you always - as soon as you take something off, put the cap on. You'll never have a bubble. And I need to -

07 22 03 33 LMP Defecate.

07 22 03 34 CMP No. (Laughter) That's all we need now. Hey, let's go over that - that postsleep checklist to make sure I haven't forgotten something. I think all I had to do was to -

07 22 03 43 CDR I'll cut it off for him.

07 22 03 44 CMP I tell you what. I'm - I'm about ready to invoke our privilege and tell them that we didn't have - we didn't keep track of the meal last night. Just to - just to tweak them.

07 22 03 56 LMP How about opening that, too, John?

07 22 04 13 CDR Okay. Wait a minute. I'll hold it up for you, sir. Here you go.

07 22 04 25 LMP Thank you.

07 22 04 39 LMP John, that Foley's shopping bag -

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**CONFIDENTIAL**

Day 8

07 22 04 40 CDR How about a cocoa, Ken?

07 22 04 45 CMP That'll be okay. I'd like to have a juice, too, though.

07 22 04 47 CDR Okay.

07 22 04 48 CMP A juice and - and coffee or cocoa or anything like that'll be fine.

07 22 04 52 CDR Okay.

07 22 04 53 CMP Man - -

07 22 04 54 CDR This coffee's ... look good. Glad we got coffee.

07 22 04 57 CMP No sweat.

07 22 04 58 LMP Okay, you've got to get - I think you've got to get the coffee out of the sack locker.

07 22 05 01 CMP And, of course, John, right now I'm doing a P52.

07 22 05 04 CDR You want me to do it? ...

07 22 05 07 LMP Are you supposed to?

07 22 05 08 CMP Yeah.

07 22 05 10 CDR ...

07 22 05 12 CMP You said that before, but it's - -

07 22 05 14 CDR Right now?

07 22 05 15 CMP - - it's going to ridiculous now.

07 22 05 16 CDR ...

07 22 05 17 CMP Yeah.

07 22 05 23 CDR If they weren't stowed, I couldn't even do what I'm doing. Where do these things here live?

07 22 05 28 CMP Okay; well, since - I think the next thing to do is to put them right back on, so why don't you just hand them to me?

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07 22 05 33 CDR Okay.

07 22 05 36 CMP I sure don't want to get a lot of crud in there.

07 22 05 38 CDR Okay, now I need no special techniques to do this.

07 22 05 41 CMP You don't even need the telescope.

07 22 05 45 LMP John, when you get around to it - -

07 22 05 46 CDR He's not even using - I better not - not even use it. When I get around to what, Charlie?

07 22 05 52 LMP When you get around to it, I'll eat your grits. If you don't want them.

07 22 05 56 CDR Okay.

07 22 05 57 LMP Or Ken's.

07 22 06 00 CMP Or both.

07 22 06 01 LMP Or both. Yeah. These are good.

07 22 06 03 CMP (Laughter)

07 22 06 05 CDR You all set, Ken?

07 22 06 07 CMP Okay; you've got to turn the optics power on.

07 22 06 10 CDR Okay, ... something like ...

07 22 06 14 CMP Okay, now take the OPTICS out of ZERO and back to ZERO.

07 22 06 19 CDR What's that switch there do?

07 22 06 21 CMP That - that's your manual switch. And if you ain't in SCS, don't touch it, which you are in SCS now.

07 22 06 30 CDR Okay.

07 22 06 32 LMP SCS - -

07 22 06 33 CDR ... P52?

07 22 06 35 CMP Yep.

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**CONFIDENTIAL**

07 22 06 38 LMP Does it keep the orb rate going?

07 22 06 39 CMP No, but I've got a rate that - it's not gonna change much.

07 22 06 46 CDR My gosh.

07 22 06 50 LMP Man, it's delicious.

07 22 06 52 CMP Okay, star 21.

07 22 07 12 CDR Right in there. That's a super platform, I'll tell you.

07 22 07 20 LMP We had ours powered down completely for 2 days. When we brought it back up, the torquing angles were something like - well, in coarse align, it doesn't - we put it - we parked it in gimbal lock. We didn't have any gyro drift updates or any PIPA bias. That procedure really worked, John.

07 22 07 43 CDR Sure did.

07 22 07 44 LMP Parking that beauty over there. And my ... was right on the time.

07 22 07 52 CMP Oh, darn. What star - that was -

07 22 07 54 LMP Thirty.

07 22 07 55 CMP Thirty. Okay. And the other star was 25?

07 22 08 01 LMP Twenty-one, you - -

07 22 08 02 CDR Twenty-one.

07 22 08 03 CMP That's what I thought, but I just saw a - Oh, that was the code. Oh, oh. ... that 25 I saw ...

07 22 08 13 CDR Be easier - ... tweak optics? Well, I'll set it back because I can't do it ...

07 22 08 31 CMP Okay.

07 22 08 37 CDR That ...

07 22 08 41 CMP That's one of the biggest gyro ... I've had.

**CONFIDENTIAL**

07 22 08 43 CDR Well, don't forget ... new man on today.

07 22 08 51 CMP Okay. Okay; why don't you torque it, and tell me when you do?

07 22 08 58 CDR Tell you?

07 22 08 59 CMP Yeah.

07 22 09 02 CDR That'll be 190:20:55.

07 22 09 06 CMP Okay.

07 22 09 09 CDR MARK. Oh, I should have PROed. That'll be 190:21.

07 22 09 13 CMP (Laughter)

07 22 09 23 CDR Okay.

07 22 09 24 CMP Okay; put it to - -

07 22 09 26 CDR Trunnion is back to normal. I'm going to CMC and ZERO. I've had - -

07 22 09 30 CMP You got the trunnion back to - close to zero.

07 22 09 32 CDR Yeah.

07 22 09 33 CMP All right.

07 22 09 34 CDR ... zero.

07 22 09 35 CMP And the CM - the mode switch is in CMC.

07 22 09 38 CDR Mode switch is going to CMC.

07 22 09 41 CMP Okay.

07 22 09 45 CDR That shaft couldn't ... trunnion, though.

07 22 09 49 CMP Hasn't gotten any worse.

07 22 09 53 CDR Now, I - I PRO out of here, right? Or ENTER out of here. PRO?

07 22 09 58 CMP ENTER.

**CONFIDENTIAL**

Day 8

07 22 10 00 CDR What do you want?

07 22 10 01 CMP Twenty.

07 22 10 06 CDR Okay; you're back and running.

07 22 10 10 LMP John, why don't you come let me mix? I've eaten my two things.

07 22 10 15 CDR Let me mix a few more, Charlie.

07 22 10 17 LMP Okay, I've ... - -

07 22 10 18 CMP Okay, we've got a lithium change. Oh, forget it. We don't do it. We can - we can do it right after we eat, if you help me remember it.

07 22 10 35 LMP Wednesday, I think I might shave.

07 22 10 38 CMP That won't - it won't hack it, Charlie.

07 22 10 40 LMP It won't work? The thing ...

07 22 10 43 CMP It will on a beard like that.

07 22 10 44 LMP Oh. What do you mean?

07 22 10 48 CMP It just sits there and whirs.

07 22 10 50 LMP Oh. It doesn't cut at all?

07 22 10 53 CMP I couldn't tell I made a dent.

07 22 10 55 LMP On your beard like that?

07 22 10 56 CMP Yeah.

07 22 10 58 CDR Charlie, you look like that, too. I hate to tell you.

07 22 11 01 CMP Yeah, I wish you wouldn't cast any stones there, old buddy. (Laughter)

07 22 11 04 LMP Well, I know it. I know it. I know it. I feel like it. That thing won't cut, huh?

**CONFIDENTIAL**

07 22 11 11 CMP I think if we cleaned it out and all, it probably would made a big difference, but -

07 22 11 14 LMP I - that'll be my project for the - for after the EVA.

07 22 11 20 CMP (Laughter) We'll be copying Flight Plan updates right through EI.

07 22 11 30 CDR That water doesn't have any bubbles in it!

07 22 11 33 CMP No, if you go slow, it doesn't. Okay, did you put the optics back up?

07 22 11 38 CDR No. Excuse me.

07 22 11 50 CDR 184.

07 22 11 52 CMP There you go. Charlie, let's see - how about setting PITCH 10 and YAW 0 on the HIGH GAIN, and - MAN - yeah. And MANUAL and WIDE.

07 22 12 51 CMP Okay; here's the covers.

07 22 12 55 LMP ... any target we pick out?

07 22 13 02 CMP Well, we had a burn yesterday.

07 22 13 04 LMP ...

07 22 13 26 CMP Now, I wonder if I can get down there and get to my bag.

07 22 13 31 CDR Your urine bag?

07 22 13 32 CMP Yeah.

07 22 13 33 CDR You want me to pass it up to you?

07 22 13 34 CMP No. Yeah. I hate for the cook to do that. (Laughter)

07 22 13 40 LMP Here's your urine bag.

07 22 13 44 CDR I just emptied it.

07 22 13 45 CMP Oh, you're a nice guy. Okay.

**CONFIDENTIAL**

07 22 13 49 CDR I had to have a urine before I started making the tow - the chow. I have - Oh, you dumb - it feels like it put hot water in the orange juice, but it didn't.

07 22 14 00 CMP No, the first shot'll be hot.

07 22 14 02 CDR The whole thing's getting hot.

07 22 14 03 CMP No. It - Yeah. Man, one of the feats of my existence the other day was, in 42 minutes, I strapped on a bag, went out of both ends, and ate lunch.

07 22 14 24 LMP Fantastic, that's a record!

07 22 14 28 CMP By doing it all at one time. (Laughter)

07 22 14 31 CDR Doing it all at the same time?

07 22 14 33 CMP (Laughter) I had this bag on the front end, a plastic bag on my rear, and a juice bag in my mouth (laughter). That's the only chance I had all day. With one back-side pass. I used to want to be the first man to Mars. This has convinced me that, if we got to go on Apollo, I ain't interested (laughter). I tell you, it's really surprising how one man in this vehicle, once you get - if you get squared away, there's enough room - and you can do more with one man in here than you can with three, operating all the equipment and everything. And I wouldn't have guessed that.

07 22 15 27 CDR It's like a three-man Gemini now.

07 22 15 29 LMP Actually, I can't get out of the way.

07 22 15 31 CDR It's like a three-man Gemini. There was no room in there.

07 22 15 38 LMP I don't see how y'all did it.

07 22 15 40 CDR Not very well. ... More hot cocoa or cold cocoa?

07 22 15 52 CMP Hot, please.

07 22 15 53 CDR Okay. This is with K.

**CONFIDENTIAL**

Day 8

~~CONFIDENTIAL~~

Page 331

07 22 15 56 CMP Oh, good!

07 22 15 58 CDR Gonna get your potassium level back to where it belongs.

07 22 16 17 CDR You want to cut your open - orange juice open? ... more cold water in there.

07 22 16 42 CMP I wonder who's responsible for all this?

07 22 16 47 LMP Dr. ...

07 22 16 48 CDR Probably no one.

07 22 16 49 LMP ...

07 22 16 52 CMP Yeah, but this - this regrouping is just - you know.

07 22 16 55 CDR Atrocious.

07 22 16 56 CMP If we hadn't talked about this beforehand, you know, I wouldn't feel quite so irritated. But we talked about this very specific problem, and I talked to all the flight directors about it. It's - if you've got to regroup with the kind of Flight Plan we've got, just emasculate pieces. Don't try to reschedule. And they all agreed, that's right; if you have to reschedule and re-write, we'll get even less done. And that's all I've done for 3 days. And my efficiency has got to be low. That's something. Gee, Charlie, I don't know. I'll be darned.

07 22 17 42 CDR What is it?

07 22 17 43 CMP I have no idea, Charlie.

07 22 17 45 LMP ...

07 22 17 50 CDR On the outside?

07 22 17 54 CMP That's a little strap - from a hatch.

07 22 17 58 CDR You can put your finger in.

07 22 18 02 CMP Probably the -

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07 22 18 07 LMP Verify ... 5000th time.

07 22 18 16 CDR That's their favorite thing to tell you to do.

07 22 18 18 CMP They'll forget to tell you to configure the jets.

07 22 18 21 CDR That's right.

07 22 18 22 CMP They'll tell me not to forget to turn the - I guess I am - -

07 22 18 27 LMP ... you'd think they'd accept the Flight Plan ... And I checked the MASTER ARM, OFF, ... checked the MASTER ARM, OFF, verify. (Laughter)

07 22 18 38 CMP Somebody has really gone Able Sugar over there.

07 22 18 41 LMP ...

07 22 18 48 CDR Really - There was two of them like that - there was two of them in there that said verify. You want me to cut this open, Ken?

07 22 18 55 CMP Yes, please, sir. Yes, I've made several notes in my Flight Plan to quit wasting time reading up trivial things.

07 22 19 08 CDR That's what - the outfit's so big now that that's their goal in life. And that's no bull. I can see it. Chris doesn't know all this bull is going on or he wouldn't allow it.

07 22 19 20 LMP What outfit ...?

07 22 19 24 CDR FAO, MCC - FAO, probably. They got - -

07 22 19 28 LMP That's our guys.

07 22 19 29 CDR That's right! But they've got these TRW weenies working for them and they're - you know, what they're gonna do is correct typographical errors on the Flight Plan next.

07 22 19 42 CMP (Laughter) Well. When all the trivial things have been done, they did get us down to the ground.

07 22 19 53 CDR Yeah.

**CONFIDENTIAL**

Day 8

~~CONFIDENTIAL~~

Page 333

07 22 19 54 LMP What? Pages and pages of corrections? ...

07 22 20 05 CMP Oh, not sometimes. Just the last 3 days (laughter).

07 22 20 12 CDR I don't see how you stood it - I really don't.

07 22 20 15 CMP I don't either, as a matter of fact.

07 22 20 17 CDR ... bad, but with three guys, it's gonna be unbearable.

07 22 20 19 CMP I ain't the most - -

07 22 20 20 CDR ...

07 22 20 21 CMP - - stable guy in the world for that kind of stuff, anyhow. And I'm quite impressed that I ain't popped off at them. But it ain't an accident.

07 22 20 29 CDR It takes ... easy going to do it. I'll tell you that, because I got mad at them yesterday. Didn't do any good.

07 22 20 40 CMP Well, that's right. It won't - won't alter anything except - -

07 22 20 43 CDR Tee the big boys off.

07 22 20 44 CMP That's right. You get a speech from Chris, and that's about what you have to look forward to when you - when you talk back. Now I take my - now I know why the Arabs eat with one hand and urinate with the other. They grew up in Apollo.

07 22 21 10 CDR What? They eat with one hand and urinate with the other? Is that right?

07 22 21 18 LMP They wipe with one hand.

07 22 21 22 CDR They won't use any paper, huh?

07 22 21 24 LMP ...

07 22 21 31 CDR That's right. Most of them eat left-handed. I remember seeing somebody.

07 22 21 35 LMP No, they eat right-handed. ... left hand ...

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**CONFIDENTIAL**

Day 8

07 22 21 41 CDR Is that right? Kill it! That guy's getting feces on the table! (Laughter) You don't dare put your left hand on the table, huh?

07 22 21 53 LMP ...

07 22 21 58 CDR Well, when I was - -

07 22 21 59 LMP That's the only - -

07 22 22 00 CDR When I - when I was eating with the ambassador in Kuwait, I saw him staring suspiciously when I got both arms on the table and put them together. He says (laughter) - I never did figure it out.

07 22 22 21 LMP ... check it out.

07 22 22 32 CDR (Laughter) Here's a grapefruit drink, Ken. What else do you want, Ken? There ain't much. There ain't much. Bacon squares or something like that?

07 22 22 43 CMP No. A couple of those - -

07 22 22 45 LMP ...

07 22 22 46 CMP - - couple of those little pills, and I'll be all set. Thank you, sir.

07 22 22 49 CDR Okay. Well, I'll - just a minute ... bags ...

07 22 22 51 LMP I'll eat Ken's grits. ...

07 22 22 55 CDR You just ate Ken's grits. How about a cup of coffee?

07 22 23 03 LMP ...

07 22 23 05 CDR How about you, Ken? You want a cup of coffee?

07 22 23 09 LMP I don't really want any coffee, no.

07 22 23 11 CMP If you've got some coffee there, put it aside, and I'll drink it later.

07 22 23 14 CDR Okay.

07 22 23 37 LMP Woo-ha! ...

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07 22 24 13 CMP I can't either. No, the thing is that I'm sure Deke was in - had to be party to that. That means he had to agree to it.

07 22 24 20 LMP Mm-hmm.

07 22 24 26 CMP I don't think the doctors had anything to do with it.

07 22 24 29 CDR Yes, they did.

07 22 24 30 LMP Doctors ...

07 22 24 34 CMP Yep.

07 22 24 35 LMP All they supposed to do.

07 22 24 36 CMP That's right. I think you're right, Charlie. They are running completely -

07 22 24 44 CDR Okay, I'm gonna stick that up here right by 305, because it's ...

07 22 24 45 LMP ...

07 22 24 47 CMP Here, I'll stick it in my pocket.

07 22 24 48 CDR Okay; that's a good idea.

07 22 24 53 CMP You got some pills there?

07 22 24 54 CDR Yeah.

07 22 24 55 CMP I'll put them in?

07 22 24 56 CDR I'll put them in.

07 22 24 57 CMP Okay; thank you. Okay.

07 22 25 00 CDR Johnny [?] should get the best.

07 22 25 03 CMP (Laughter)

07 22 25 05 LMP ... sunrise.

07 22 25 08 CMP Hey, you should look at that - that corona at sunrise. That's really pretty.

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**CONFIDENTIAL**

Day 8

07 22 25 13 CDR Charlie, what else do you want? You don't want any bacon squares, huh, Charlie?

07 22 25 15 LMP No. Just some - just like some juices.

07 22 25 19 CDR Okay; coming up. How about a orange juice?

07 22 25 26 LMP That's fine. Is that cocoa ...? One more time ...

07 22 25 32 CDR Okay.

07 22 25 33 CMP Now where did I put my Flight - Yes, sir, we are in attitude and - -

07 22 25 42 CDR Who you talking to?

07 22 25 45 CMP Oh, it'll be - the horizon right now is right down here. If you'll turn the - turn the floodlights down, you'll probably see it right now.

07 22 26 07 LMP ...

07 22 26 11 CMP ... find it, I'll show you ... Well - Yeah, it may be because the old terminator's moving around pretty rapidly. When it comes up, you can see it - you can see it nicely with the cabin lights up and everything. It's - it's really pretty.

07 22 26 32 CDR Ken, you're kicking this stuff off the food bay.

07 22 26 35 CMP Oh, excuse me. I'm sorry.

07 22 26 36 CDR No problem.

07 22 26 37 CMP I'm sorry.

07 22 26 45 CDR You can put your foots on there now.

07 22 26 49 CMP No, I don't put my feet on the dinner table.

07 22 26 52 LMP ...

07 22 26 53 CDR I think you put your left hand on it the other day; you might as well put your feet on it.

07 22 27 01 CMP Now, now. I know what I'll do. I'll fold my tent. Suit donning. Ah! An exercise in futility. The - the thing is that what we have to do now is, after

**CONFIDENTIAL**

suit donning, we still - when we go to doff the suits now we still got to go back and stow stuff in the places that was gonna originally have been stowed.

07 22 27 35 CDR Yeah.

07 22 27 42 CMP In fact, I tell you what, when you guys go into the IM to don the suits, I can go stow that stuff before I put my suit on.

07 22 27 50 CDR That's a good idea.

07 22 27 52 CMP Hey, that'll - that'll get it done a lot faster.

07 22 27 59 LMP ...

07 22 28 02 CMP Okay. You know we can always handle stuff like that. That's no big deal.

07 22 28 10 LMP ...

07 22 28 12 CMP Well, I tell you, I - I'm - I'm really confused, because I am thoroughly convinced that what John's been saying about everything goes up to the tunnel is true. And in SIM bay attitude with only the minus-X jets firing, that makes sense. And it's true I'll wake up in the morning, and the - the tool E is always hanging that way, the jett bag's up there, all my trash is going up there. It's a - it's a self-cleaning cockpit.

07 22 28 41 LMP Yeah.

07 22 28 43 CMP But when you go to couples, they still hang up there. And I ain't figured that out.

07 22 28 51 CDR Well, I'll tell you why. Undocked, it's colder up there. They settle out when the cold hits there. Pressure changes.

07 22 29 03 LMP ...

07 22 29 08 CMP We're gonna do it earlier than that, old buddy. There is - there is only one - one way to survive with MSFN. And that's to get ahead and don't tell them. Now we're coming up on time to open the hatch now. Sit there in your suit. Huh? What do you mean?

**CONFIDENTIAL**

07 22 29 30 LMP ...

07 22 29 33 CMP Okay. That's - that's all you do. All you're doing is seeing that they've got in the command that runs the tape. Yeah.

07 22 29 40 CDR Juice for you, Charlie. What else do you need?

07 22 29 44 LMP I might of been ...

07 22 29 50 CMP (Laughter) Well, I'm ready to say, at this point, I don't care. All they can do is tell me to come home, which they have already done. And they ain't gonna take my next flight away from me, so -

07 22 30 14 CMP Really does upset me. All the time you put into trying to make it a good one, and then someone that hasn't given it any real thought or effort comes up and wipes it all out with a stroke of his hand.

07 22 30 30 LMP What's his name? ...

07 22 30 38 CMP Well - not - that's - Okay, but that's different. That's unavoidable, you know, and we regrouped from that nicely. We got everything done that we would have done - at least on my end, I got everything done that I would have done had we not slipped that three revs. So that was no - you know, that - that part worked out okay.

07 22 31 03 LMP ...

07 22 31 11 CMP But - then - then to cause this - you know, that we regrouped from without a great deal of trouble, and everybody knew we had to regroup. But this, I just don't - I just don't understand it. We're gonna end up doing things halfway.

07 22 31 42 LMP ... yesterday ... It wasn't working right ... they said, "Okay. You got an hour and a half." ... Okay. You got that one? Come around and get this. ...

07 22 32 12 CMP Just sitting there in a limit cycle.

07 22 32 15 LMP ... and I don't think ... we ...

07 22 32 18 CMP I know.

**CONFIDENTIAL**

07 22 32 19 LMP

...

07 22 32 20 CMP

No. That's right. It's better to take a plan you understand and is thought out that is less than optimum and execute it the way you planned it.

07 22 32 29 LMP

All we had to do was take our checklist and subtract 10 minutes from this, subtract 10 minutes from that ...

07 22 32 40 CMP

Yeah.

07 22 32 41 CDR

They didn't do that.

07 22 32 43 CMP

I thought that's why we picked these kind of people throughout the program - was people that understood how to operate as opposed to how to have meetings. But it's been a - this has looked more like a - an operational data priority than a -

07 22 32 58 CDR

... they're not. I don't ever expect those guys to understand the - -

07 22 33 05 CMP

Well, that's why - -

07 22 33 06 CDR

- - rules of operation.

07 22 33 07 CMP

- - we got Sir Lovell down there to - -

07 22 33 08 CDR

You know that's a mistake. You don't do that.

07 22 33 13 CMP

(Laughter)

07 22 33 14 CDR

... pilots. They ain't got ...

07 22 33 17 LMP

...

07 22 33 19 CMP

(Laughter)

07 22 33 20 CDR

... You get a little peeved, I'll tell you that.

07 22 33 26 CMP

Hey, now, look. There's - there's meal A, day 9. Now -

07 22 33 31 CDR

Where?

07 22 33 32 CMP

Right there.

**CONFIDENTIAL**

07 22 33 34 CDR No, you - that's what you ate this morning. I just fixed it for you.

07 22 33 37 CMP Oh. Well, you've got to eat one.

07 22 33 40 CDR Oh, well, I ain't got around to that.

07 22 33 42 CMP Well, you can't - you can't button up your toys. You've got to go - -

07 22 33 46 CDR You want to - you want these in here?

07 22 33 48 CMP No.

07 22 34 02 CDR If I eat it, I'm going to have to defecate.

07 22 34 22 CDR Here you go, Charlie. How many you want? Oh, no, no, no, no, no. The pills are floating!

07 22 34 44 CMP Oh. I'll do that. Hey, Charlie? Oh, the LM was hiding it. That's why you couldn't see it. Here.

07 22 34 57 LMP ... see it.

07 22 34 58 CMP See a corner of it. Look straight out the ... It's almost sunrise. Aw, you missed it. Get your head out of there before it comes up. Okay.

07 22 35 27 CDR Come here, you little pills.

07 22 35 46 CMP You know, one of the things I found worked real well was, instead of using the - the big trash bag - (laughter) - That one just got shot down - was to keep one little temporary trash bag out that was easy to get in and out of. And put stuff in it, and then every - couple times a day, dump that into the big trash bag.

07 22 36 07 CDR Yeah. That's what I got between my legs, I think.

07 22 36 14 CMP Looks like we overdid it. I should've kept - I thought about keeping one of those jett bags ...

07 22 36 19 LMP ...

07 22 36 22 CDR I can't! There's no way.

07 22 36 25 LMP ...

**CONFIDENTIAL**

Day 8

~~CONFIDENTIAL~~

Page 341

07 22 36 34 CMP Pull up the ladder. I tell you what. If you -  
are you using that table?

07 22 36 39 CDR No, not right this second. Gonna change that LiOH  
canister?

07 22 36 44 CMP Yeah. The other terminator is prettier, because  
it's - got more - relief to it.

07 22 36 50 LMP ...

07 22 36 51 CMP Yeah. It is. There's - -

07 22 36 53 CDR What's that?

07 22 36 54 CMP That's your meal! You're getting behind, John.  
Oh, what canister was that I was gonna change? I  
was gonna put 16 into A - no, 13 in A-3.

07 22 37 36 CMP (Sneeze)

07 22 38 16 LMP ...

07 22 38 17 CDR What's the matter?

07 22 38 19 LMP ...

07 22 38 22 CMP What's wrong with that? Huh?

07 22 38 29 LMP ...

07 22 38 50 CDR ...

07 22 38 53 CMP I've cut you off from all your chow.

07 22 38 55 CDR No, that's all right.

07 22 38 57 CMP Can you get to everything?

07 22 38 58 CDR Yeah.

07 22 39 09 CDR I know why the guys had arrhythmias and took so  
long to get back in shape; they couldn't move  
around - couldn't move!

07 22 39 26 LMP ...

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**CONFIDENTIAL**

07 22 39 29 CMP Oh, yeah, you can. It's - it's kind of overwhelming at first, but it - it catches up and it's - -

07 22 39 38 LMP ...

07 22 39 42 CMP Are we - where are we now? About Men - no, we're past Mendeleev.

07 22 39 59 CMP I want to show you that - -

07 22 40 00 LMP ...

07 22 40 01 CMP I think we're past Mendeleev, if I'm not mistaken. Yeah. Give you what? Huh?

07 22 40 21 CDR I don't know, Charlie.

07 22 40 33 CMP Who put these stupid sponges in here? That's one sponge that ain't going back to Houston.

07 22 41 18 LMP ...

07 22 41 52 LMP ...

TIME SKIP

07 23 59 18 CMP Four open. ... four closed. ...

**CONFIDENTIAL**

~~CONFIDENTIAL~~

## DAY 9

08 00 00 04 CMP And we're coming through here. We're about on the time line, but the trouble is, they didn't allow enough time. If we don't get ahead somewhere, we'll never make it.

08 00 00 11 CDR I know it.

08 00 00 13 LMP I - I think we'll catch up over here, Ken.

08 00 00 15 CMP Yeah, but when we get to that suit-donning business, that's where the whole world falls on its ears.

08 00 00 17 LMP That's right.

08 00 00 18 CMP I can't follow that. I keep trying. So we're right down here, now. Jettison comes up - Let's see, have you got it? Got this 30 minutes, here's 30, there's an hour. But most of this is gonna get taken up with suit donning. And I've got to reconfigure the cockpit here. And then we close the hatches and do the jettison over here. And then I know good and well they're gonna have - they're gonna have us do all kinds of stuff in here. It won't be nice and clean like this. They're gonna be rolling left, reading updates, and all that bull. During the eat period, you're gonna take your suit off. I'm almost at the point of just saying, forget it, I'll keep my suit on for EVA.

08 00 01 27 CMP No. No. (Laughter) Sometime tonight about 200 and - 200 and - that's not far away. 210? 220? No. It was normally 220. So it ain't very far. There's - 200 hours; 8 hours from now.

08 00 01 54 LMP What, TEI?

08 00 01 55 CMP Yes, sir.

08 00 01 56 LMP You're kidding.

~~CONFIDENTIAL~~

**CONFIDENTIAL**

08 00 01 57 CMP No, I'm not. You know, I - and there's - I even threw out where that time is to sit down and take an hour and get ready for TEI. And I'm ready to tell them to delay it a rev, if they don't give us one. I just can't seem to do a TEI in a - hurry with a whole lot of things dangling.

08 00 02 31 LMP Yeah, you can come over here and cut this cord, John.

08 00 02 53 CMP I thought we had such a good chance of completing the mission. And then go home. At least you guys got all your work done.

08 00 03 01 CDR Yeah, but that ain't fair to you.

08 00 03 04 CMP Well, it ain't individual fairness that counts in this program. The program has never tried to do that.

08 00 03 10 LMP Okay. You're maneuvering to steerable attitude, right?

08 00 03 13 CMP I'm there.

08 00 03 14 LMP Okay.

08 00 03 15 CMP Yeah. You said sharp, VHF, I guess.

08 00 03 26 CMP You can start moving these ACAs, if you want to. I got a - I got a procedure for you. (Laughter) Wait. There's a change.

08 00 03 40 LMP Huh?

08 00 03 41 CMP I'm sure there's a change, Charlie. You don't want to do it yet. I'm sorry, John. What? No. Well, to check the procedure, it moves power to them.

08 00 04 00 CDR We might have some power right now, but it removes power.

08 00 04 44 CMP Okay. Look here.

**CONFIDENTIAL**

~~CONFIDENTIAL~~

08 00 04 57 CDR Make sure of that, Charlie. Ace performance on backing it out of - I think I'll just go right through here. This shorting plug's dimmer.

08 00 05 08 LMP Well, that doesn't matter. We're not gonna have any power. That was because it was - it'd do that so they would see you removing power off of it on the front side; but we don't have power on it anyway.

08 00 05 21 CDR ... one ...

08 00 05 36 CMP Okay; go ahead.

08 00 05 40 CDR Okay. Well, see, push them all back in over here, anyway.

08 00 05 43 CMP ...

08 00 05 47 CDR You can leave that - you can leave all your breakers in.

08 00 06 01 CMP Okay.

08 00 06 09 CDR Huh?

08 00 06 12 LMP Yeah, we're on the back side, aren't we, Ken?

08 00 06 14 CMP Yes, sir.

08 00 06 15 LMP Okay.

08 00 06 18 CMP Okay.

08 00 06 19 LMP What?

08 00 06 20 CMP Okay, both the same.

08 00 06 33 CDR ... these two right here? ... It's real hard; you just got to really pull.

08 00 06 54 CDR Okay.

08 00 06 56 CMP Let's see, there's a little clips here you can use, John.

~~CONFIDENTIAL~~

**CONFIDENTIAL**

08 00 07 31 CMP Huh?

08 00 07 40 CDR Ken, you've already done it. Won't go forward? Yeah, uh-huh. It's cross sliding ... Here are the screwdrivers and the -

08 00 08 31 CMP These two right here. This one right here. There's one - there's one back up under here.

08 00 08 39 CDR Ken, you probably need a flashlight. They're cross sliding. Do you have your flashlight? They're cro - I think you've got the wrong screwdriver.

08 00 09 24 LMP Huh?

08 00 10 11 CDR There you go.

08 00 11 13 CMP I need to defecate. Hey, I was gonna suggest, if you guys need to take one, you ought to do it before we get rid of the LM.

08 00 11 17 LMP I agree. Let me get over here.

08 00 11 27 CMP Does anybody have any desire to keep this URA?

08 00 11 29 LMP I don't. Doesn't look like we'll get to use it.

08 00 11 32 CMP Well, even if we did, the thing doesn't work.

08 00 11 35 LMP Yeah.

08 00 11 37 CMP I'd just as soon get rid of it. It's just that much more volume we have to play with.

08 00 11 39 LMP Bring her over.

08 00 11 41 CMP Okay.

08 00 11 45 CDR I might - I'm gonna keep this bag, though. I think that might be a good trash bag. Got a zipper on it.

08 00 12 28 CDR Won't turn? Which one - which screw? Can't get this screw out?

**CONFIDENTIAL**

~~CONFIDENTIAL~~

08 00 12 36 LMP ...

08 00 12 44 CDR It's this one right under here - you can't - no?  
There you go.

08 00 13 06 CMP Okay, torque that dude, will you?

08 00 13 26 CMP Let me try it.

08 00 14 09 LMP Let me hold it, maybe you can push on it, you  
know. Okay, you're not quite. ...

08 00 14 24 CMP You're on internal power, aren't you, Charlie?

08 00 14 25 LMP Yeah, uh-huh. I got bats on.

08 00 14 30 CMP I was wondering - you suppose there's any reason  
to save these - the umbilicals?

08 00 14 32 LMP No.

08 00 14 33 CMP You don't want them?

08 00 14 34 LMP Uh-huh.

08 00 14 35 CMP Okay.

08 00 14 37 CDR ... on that.

08 00 14 41 CMP I guess we can leave them in, then. Latches and  
all are gonna go, so that doc - that electrical  
connection should go, too. It should sever right  
here.

08 00 14 51 CDR There they go on their trip to the Moon.

08 00 14 54 CMP Oh, sure.

08 00 14 58 CDR Huh? Yeah. You want to go on through - well,  
I'm - I've got the CBs dumped and - We're right  
here for the docked IMU align. I'm gonna let you  
do that. Let me try and stop. Okay.

08 00 15 17 LMP Hey, Ken. Are you in MIN DEAD BAND, attitude hold?

~~CONFIDENTIAL~~

**CONFIDENTIAL**

08 00 15 20 CMP Yes, sir. Use the thumb switch.

08 00 15 25 LMP Okay, you need a ...

08 00 15 34 CMP Whoops! Is this your - this isn't a - this is your transfer items bag, huh?

08 00 15 37 CDR Yeah.

08 00 15 39 CMP (Laughter) I don't want to throw my trash in there.

08 00 15 49 CMP Okay. Well, you got - What did you do with those jettison bags? You tied them down, huh?

08 00 15 58 LMP Yeah, they're all tied down. Just - I can stuff them down -

08 00 16 02 CMP Just give me that stuff - there's plenty of places to stuff. Good old 06 20. All right.

08 00 16 17 CDR Can you imagine in - in orbit?

08 00 16 21 LMP I can't believe EVA, John. Those guys! Suppose we'd had a short in your thing?

08 00 16 31 CMP Okay; you ready for the 06 20, John?

08 00 16 42 CMP Hey, John? Oh, 323.17. Oh, heck. We're - we're moving around. Just call it 323, 116 and 305.

08 00 16 56 CDR ...

08 00 16 59 CMP Yeah, I know. But there ain't no sense in counting hundredths when I got a half-degree dead band. It's 323.17, 116.36, 305.00.

08 00 17 14 CDR ... 305.00?

08 00 17 16 CMP Yep. But those numbers are changing.

08 00 17 18 CDR Huh?

08 00 17 19 CMP Those last two digits are changing. Okay.

08 00 17 27 CDR ...

**CONFIDENTIAL**

08 00 17 34 CMP We were doing it with an 06 20 of a mark and an ENTER right then and there that'd correct it. Huh? Oh, wait a minute. Let me go to SCS, I can get you a smaller dead band with that.

08 00 17 53 CDR ... that's fine.

08 00 17 56 CMP Okay. Do whatever you want.

08 00 17 59 LMP John, I can't budge mine either. I don't know how big of a screwdriver the guy had, but he must of had a monster. ... Can't even come close to it.

08 00 18 36 LMP Well, guess what.

08 00 19 00 CDR We don't get to bring our ACAs back.

08 00 19 19 LMP I can't budge it. I just cannot budge it.

08 00 19 55 CDR Yeah.

08 00 20 11 LMP Okay. It'll be plus 45, 361, 304 - What's the command module?

08 00 20 46 LMP That's 304. This is 304, minus 323. Be a minus number ... in the 300s. 300 plus 4 is 304.

08 00 21 30 CDR Add 360 to that one ... Yeah. Make it - yeah, why not? Okay.

08 00 21 46 LMP ...

08 00 21 47 CDR Now subtract - -

08 00 21 48 LMP Okay.

08 00 21 49 CDR - - 33, 3, 1, 4, 3 - 341.

08 00 21 58 LMP Yeah. I do, too. Okay, now this one is plus 160 and ... is straight forward to ... 6. Okay, that looks okay. Well, John, don't get to ...

08 00 22 45 CDR Huh?

**CONFIDENTIAL**

08 00 22 56 CDR Look I - I can't understand you. Oh, you wanted this right here.

08 00 23 13 LMP I don't know what you're gonna do with that. Can't roll it, stick it on itself. You could put a piece of tape on the back of it, John. Here, let me do that.

08 00 23 20 CDR Oh, yeah. I'll - I'll -

08 00 23 22 LMP You do this, and I'll (laughter) ...

08 00 24 01 LMP ... this thing ... this neat.

08 00 24 29 LMP Hey, Ken, ... on my mark - on your mark.

08 00 24 38 CMP Say when.

08 00 24 40 LMP Tell me what GET it is. Up the GET and give me a mark. Okay? O - okay, Ken. On the comm.

08 00 24 49 CMP Okay. I'll do it on the comm at 192:36:40. Stand by -

08 00 24 53 CMP MARK. Got it? You got the time?

08 00 24 58 CDR Yeah.

08 00 25 00 CMP Okay. And the angles are - -

08 00 25 01 LMP Wait a minute, say the time again.

08 00 25 02 CMP 192 - -

08 00 25 03 LMP Okay - -

08 00 25 04 CMP 36.

08 00 25 05 LMP 192:36 - -

08 00 25 06 CMP 40.

08 00 25 07 LMP 40.

08 00 25 08 CMP Okay.

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 351

08 00 25 09 LMP Okay.

08 00 25 10 CMP The 06 20s are 322.94.

08 00 25 11 LMP 322.94.

08 00 25 13 CMP 116.31.

08 00 25 16 LMP One decimal, what?

08 00 25 18 CMP 116.31.

08 00 25 21 LMP 116.31.

08 00 25 23 CMP 304.99.

08 00 25 24 LMP 304.99. Thank you.

08 00 25 26 CMP ...

08 00 25 27 LMP Thank you.

08 00 25 37 LMP Crummy things. That upsets me. Really ... beat.

08 00 26 01 LMP Not in this attitude. Why does it have to?

08 00 26 18 LMP Let me try this again, John.

08 00 26 54 LMP You want to give up on those things?

08 00 26 57 CDR Huh?

08 00 27 01 LMP You want to give up on those things?

08 00 27 04 CDR Give up?

08 00 27 06 LMP On the ACAs?

08 00 27 41 LMP Yeah. Uh-huh. All that's in there. You can do the T<sub>ephem</sub>. Ken's got the T<sub>ephem</sub>. You can do all this stuff. Bring up the numerics lighting; you can get the ... count; ... just like we did on the activation.

08 00 28 12 CMP You probably have the right T<sub>ephem</sub> in there, don't you?

~~CONFIDENTIAL~~

**CONFIDENTIAL**

08 00 28 15 LMP Probably.

08 00 28 17 CMP That won't change just because you powered down.

08 00 28 20 LMP No. Un - unless they've changed yours since we powered down.

08 00 28 25 CMP No, we haven't changed anything like that.

08 00 28 28 LMP I didn't think so.

08 00 28 38 CDR Ken, what's the GET?

08 00 28 39 LMP What's the GET, Ken? Give us a mark at - Okay.

08 00 28 42 CMP Okay. It's 192:40:30 now, and you can have a mark at 192:41.

08 00 28 50 LMP Okay. 192:41, John.

08 00 29 09 CMP 4, 3, 2, - -

08 00 29 11 LMP Not gonna make it.

08 00 29 12 CMP - - 1. Okay. How about 41:30?

08 00 29 15 LMP That's good, 41:30, John. Okay; we're ready.

08 00 29 19 CMP All right.

08 00 29 33 CMP 10 seconds to go.

08 00 29 37 LMP Okay, 10 seconds, John.

08 00 29 39 CMP/LMP 5, 4, 3, 2, 1 -

08 00 29 43 LMP MARK.

08 00 29 44 CMP ENTER. Okay, we got it going.

08 00 29 46 CDR Okay.

08 00 29 54 CDR And we need a T<sup>ephem</sup>, Ken.

08 00 30 01 LMP Yeah. Let's - Okay. Why don't you read it out and see - -

**CONFIDENTIAL**

08 00 30 06 CDR Okay, VERB - -

08 00 30 10 CMP Why don't you read out what you got - VERB ... compare them. I hate to change it. Okay. He's got the clock update now.

08 00 30 35 LMP Hey, Ken. There's a - there's a towel over in - in my TSB that's got a red stripe on it. Will you put some water on it and - and throw it across, please?

08 00 30 46 CMP Yes, sir.

08 00 30 47 LMP Thank you.

08 00 30 50 CMP Surely will. You want cold or hot water?

08 00 30 58 LMP Cold. I just want to clean off this jett bag.

08 00 31 01 CMP Oh, oh, okay. That's right.

08 00 31 03 CDR ... face ... or something?

08 00 31 10 CMP Okay.

08 00 31 11 LMP Huh? You need what?

08 00 31 21 LMP He said he needs a T<sub>ephem</sub>, Ken.

08 00 31 24 CMP Okay. Before we change it, why don't we check it? I - I hate to change it.

08 00 31 28 LMP How do you read lookout octal? VERB 04? Okay; let's look at it and see what it is.

08 00 31 45 LMP What you got, Ken?

08 00 31 47 CMP (Laughter) I'm one of those darn octopies [?].  
I -

08 00 31 52 LMP Yeah. I know.

08 00 31 53 CMP - - ... just a second. Excuse me. He'll be there in a minute, Charlie. Here comes your rag.

08 00 31 59 LMP Okay; thank you. Huh? Don't know whether it's good or bad.

**CONFIDENTIAL**

08 00 32 17 CMP Got 47651, 70362, and 67651.

08 00 32 24 LMP That's not even close to what we got.

08 00 32 26 CMP What you have?

08 00 32 27 LMP We got 11, 000, 11. Give us the numbers.

08 00 32 32 CMP Okay. I'll - -

08 00 32 33 LMP Wrong one. Let me make sure I got this out right now before you change all that. I just looked up 1703.

08 00 32 40 CDR ... 1706. I can tell you that for sure.

08 00 32 52 CMP Okay, three balls 11.

08 00 32 56 LMP Okay.

08 00 32 57 CMP 13347.

08 00 32 58 LMP Okay.

08 00 32 59 CMP 65620.

08 00 33 00 LMP Okay; same. We got it. Yeah. Go ahead.

08 00 33 22 LMP Is it bad?

08 00 33 33 LMP That was really a dumb decision. And it was all because the docs got them panicked.

08 00 33 42 CMP It goes further than that, Charlie. The docs may have caused the panic, but somebody had to realize - someone operationally should have realized that - that no matter how panicked they were, they couldn't do any better than what they had already planned.

08 00 33 55 LMP Yeah.

08 00 33 56 CMP They should've seen that.

08 00 33 57 LMP Do what, John? Yeah. Go ahead; whatever it says do. You do ahead and do. We're not gonna get the edge. Go ahead. Just push them all in.

TIME SKIP

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 355

08 03 22 57 CMP You should not, but if you get one, it'll come on right away.

08 03 23 02 LMP Okay.

08 03 23 03 CMP And I'll get up here and see if I can look out this side hatch, too.

08 03 23 07 CDR Okay.

08 03 23 10 CMP Okay; we're about to jettison the boom.

08 03 23 13 CDR Okay.

08 03 23 14 CMP Okay; go.

08 03 23 15 LMP Okay. It's up - -

08 03 23 18 CMP Okay.

08 03 23 19 LMP - - and off. There she goes.

08 03 23 22 CMP Boom clear.

08 03 23 23 LMP Straight out. Boom's clear.

08 03 23 24 CMP I'll see if I can see it.

08 03 23 25 LMP Not a bit of roll. There she goes, Ken, this way - -

08 03 23 28 CDR ... see it.

08 03 23 29 LMP - - straight out window 5.

08 03 23 32 CMP Hey, that is beautiful.

08 03 23 33 CC ...

08 03 23 34 CDR That's affirmative.

08 03 23 35 CMP That's about as stable as you can get. That thing isn't tumbling, rolling, doing a thing.

08 03 23 42 CDR Let me see it. Can I see it?

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Day 9

08 03 23 43 CMP Yeah. It's right straight out there. Beautiful. Here, Charlie. Charlie?

08 03 23 49 LMP Yeah.

08 03 23 53 CDR There she goes!

08 03 23 56 LMP Gee, I hadn't even thought of that. ...

08 03 24 00 CMP It's all set.

## TIME SKIP

08 03 56 12 CC - - POWER; 197:05, configure camera for orbital science; CM5/EL - -

08 03 56 37 CMP Whose?

08 03 56 38 CC - - 230/CEX intervalometer. That's f/8, 1/250 - -

08 03 56 48 LMP Huh?

08 03 56 50 CC - - infinity. You'll be taking 128 frames - -

08 03 56 55 CMP I think this is where it's - where it's bad.

08 03 56 57 CC - - magazine Romeo Romeo.

08 03 57 02 CMP ... got it ...

08 03 57 06 CC 197:14 - -

08 03 57 09 CMP Okay; what's that gonna be a target of, Hank?

08 03 57 11 CC - - PC - Okay, we're going to pick up that long run you had that started down at Vogel and - -

08 03 57 23 LMP Why don't you get a new one of those?

08 03 57 26 CC - - and went up to Lassell and Alpetragius and stopped. And then you picked up at the one down at Bullialdus. Well, Bullialdus - -

08 03 57 32 LMP Hey, John.

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08 03 57 33 CC - - is too far south. So what we're going to do is start at Vogel, make a jog at Alpetragius, and go all the way to the Helmet on past Gassendi. And we're about up on LOS now; I'll tell you more about that at AOS.

08 03 57 47 CMP Okay, Hank. Thank you.

08 03 58 08 CMP Okay. What were you getting ready to ask?

08 03 58 10 CDR Huh?

08 03 58 11 CMP What were you getting ready to ask?

08 03 58 12 CDR ...

08 03 58 13 CMP Okay. I got to - got to launch this satellite now.

08 03 58 18 LMP What time does that come on?

08 03 58 20 CMP In 3 minutes. John, can you get over there? I got to launch this satellite in 3 minutes.

08 03 58 25 CDR Sure.

08 03 58 29 CMP Okay; I'm panel 230. Check that the DATA SYSTEM is ON.

08 03 58 37 LMP Here, I'll get it, John.

08 03 58 39 CDR ...

08 03 58 42 CMP Okay. On panel 230, you got a couple more things. Make sure the - Is the gamma ray retracted? Is the switch down in RETRACT position and is the talkback gray?

08 03 58 58 CDR Yeah.

08 03 58 59 LMP ...

08 03 59 00 CMP Okay; before I can tell if that talkback's gray, are those switches on 181 in the center OFF or in the DEPLOY/RETRACT position? Put them down to DEPLOY/RETRACT.

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**CONFIDENTIAL**

08 03 59 16 CDR ...

08 03 59 19 CMP Huh?

08 03 59 20 CDR GAMMA RAY's still gray.

08 03 59 21 CMP Okay. ALPHA/X-RAY COVERS, CLOSE, Charlie.

08 03 59 26 LMP Oh, sure.

08 03 59 27 CDR ALPHA/X-RAY - -

08 03 59 28 LMP Hey, wait a minute. They're here. They are closed.

08 03 59 38 CMP We're in attitude; we've been damping rates. Holy smokes! Where was I going to put that attitude? Okay.

08 03 59 55 CMP Okay, on 250, we've already checked our PYRO A, SEQUENTIAL A; PYRO B, SEQUENTIAL B is closed. Okay; on 181. LOGIC POWER, two, is closed. We know that. The LOGIC POWER switches, two of them, up to JETTISON.

08 04 00 16 CMP Okay. All right, the next thing we'll do is I'll give you a call when to hit the SATELLITE LAUNCH switch. And we - we're about a minute and a half from the launch. And the SATELLITE LAUNCH switch is one - is one that you put up and hold. I think it's a three-position guy.

08 04 00 36 LMP That ... switch?

08 04 00 38 CMP Yeah. But not now. I'll give you a call.

08 04 00 42 SC ...

08 04 00 44 CMP We'll see if it - if it - should be a - a - maintain. And it should go barber pole when you put it up, and it should hold barber pole until it's launched, and then it should go back to gray.

08 04 01 10 CMP Say again?

08 04 01 11 LMP ...

**CONFIDENTIAL**

Day 9

**CONFIDENTIAL**

Page 359

08 04 01 12 CMP Okay. And the circuit breakers are in? The two logic guys next to them? All right.

08 04 01 40 CDR ... seconds.

08 04 01 55 LMP Two, 3, 4, 5 -

08 04 01 59 LMP LAUNCH.

08 04 02 01 SC ...

08 04 02 11 SC ... out there.

08 04 02 35 CMP Okay, did you turn? RETRACT?

08 04 02 38 LMP ... found this mistake.

08 04 02 46 CDR Barber pole?

08 04 02 48 LMP ...

08 04 02 51 CDR ... go gray?

08 04 02 53 LMP ...

08 04 02 54 CDR It went back to the center OFF position?

08 04 02 57 LMP They're OFF.

08 04 02 58 CDR Okay, LOGIC POWER ... 181 ... DEPLOY/RETRACT. That's done.

08 04 03 03 LMP ...

08 04 03 06 CDR Okay.

08 04 03 07 LMP ...

08 04 03 08 CDR All right.

08 04 03 09 LMP ...

08 04 03 11 CDR Good. ... good work.

08 04 03 15 LMP I found our - I found their mistake. Their mistake. They left the - they didn't have any AC power ...

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08 04 03 30 LMP ...

08 04 03 35 CDR Yeah.

08 04 03 41 LMP ... asking me - asking me AC power.

08 04 03 45 CDR ...

08 04 03 46 LMP Yeah. Okay. ...

08 04 03 51 CDR Okay, Charlie. It's - it's no good then.

08 04 03 54 LMP Okay. ...

## TIME SKIP

08 04 49 10 CC - - changing over at Alpetragius - a little jog and then on up past the cinder cone. And you were originally scheduled to look at Bullialdus, and we're going to have to delete that because your track is too far to the north now. So, we're going to bring your groundtrack from the cinder cone right on up through Helmet and Gassendi and on up to Mersenius Rille, from D-11, 12, and 13.

08 04 49 39 CMP Okay, you want to take one continuous strip.

08 04 49 42 CC That's affirmative.

08 04 49 43 CMP This is to be one continuous strip from Vogel to Alpetragius to the cinder cone to the Helmet to Gassendi to the Mersenius Rille. Okay. I tell you what - -

08 04 49 57 CC ... except that there will be that little jog at Alpetragius over to - to the right there and then on up through cinder cone and straight on up through Helmet, then Gassendi and on up to the rille.

08 04 50 06 CMP Yeah, I understand that. I'm going to have to have some help on the f-stops, and I guess I'd rather have you call them out to me rather than have me try to write them down and jot them on the map and all that jazz.

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 361

08 04 50 22 CC Okay; we'll do that.  
08 04 50 23 CMP Okay; thank you. And can you give me a time for  
passage of Vogel?  
08 04 50 32 CC Okay; hang on a minute.  
08 04 50 36 CMP That - it should be - -

TIME SKIP

08 05 52 51 CDR Okay. "Load 509 at 199:40."  
08 05 52 56 CC ...  
08 05 53 16 CDR Go ahead. Over.  
08 05 53 18 CC ... - -  
08 05 54 59 LMP Some chicken soup?  
08 05 55 00 CC - - ... - -  
08 05 55 06 CMP Hmm?  
08 05 55 08 CDR ...?  
08 05 55 09 CMP Yeah.  
08 05 55 11 CDR ... the last one.  
08 05 55 12 CMP Yeah.  
08 05 55 13 CDR Okay.  
08 05 55 14 LMP Chicken soup. I get you some meatballs with sauce;  
you got some instant breakfast; you got some  
orange juice.  
08 05 55 17 CC - - ... - -  
08 05 55 25 CDR Okay.  
08 05 55 26 CC - - ...

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08 05 56 15 CDR Okay. Pre-TEI-64, SPS/G&N; 38 - 3 - 38332;  
plus 0.61, plus 0.95; 200:33:20.44; plus 3265.6,  
plus 0808.0, minus 0215.1; 180, 000, 000;  
plus 21.7, plus 3371.0 - -

## TIME SKIP

08 08 13 54 CMP TVC SERVO POWER 1, SERVO POWER 2, done. ROTATION  
NORMAL, number 2 to AC, the DIRECT 2s are OFF.  
BMAGs, three, to 1/2. SPACECRAFT CONTROL going  
to SCS -

08 08 14 05 CMP MARK. RHC number 2 is armed. Standing by to  
bring on MAIN A's - -

08 08 14 11 CDR Go ahead.

08 08 14 12 CMP - - 20 seconds. I've got no objections to doing  
them now.

08 08 14 17 CDR Okay.

08 08 14 18 CMP Here comes MAIN A, number 1.

08 08 14 19 CDR One.

08 08 14 20 CMP One.

08 08 14 21 CDR Good start.

08 08 14 22 CMP Number 2.

08 08 14 23 CDR Good start.

08 08 14 24 CMP Okay. Thumbwheel trims.

08 08 14 28 CDR Okay, plus 61.

08 08 14 30 CMP Plus 61. The trim's good in both directions on  
pitch.

08 08 14 32 CDR Plus 95.

08 08 14 34 CMP Plus 95 in yaw. Trim is good in both directions  
in yaw. Let me try a little MTVC. Pitch is good.  
Yaw is good.

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Page 363

Day 9

08 08 14 45 CDR Yeah.

08 08 14 46 CMP Return to zero. SPACECRAFT CONTROL, CMC -

08 08 14 50 CMP MARK.

08 08 14 51 CDR Okay.

08 08 14 54 CMP Okay. TRANSLATION CONTROL, clockwise -

08 08 14 59 CMP MARK. Dadgum. Okay. I have no MTVC. MAIN B, number 1.

08 08 15 11 CDR Go ahead. Good start.

08 08 15 13 CMP Okay. Check that, 0.6. Pitch. Okay, we won't start number 2 yet; we'll start it later.

08 08 15 21 CDR Okay.

08 08 15 24 CMP Okay, going back to neutral.

08 08 15 27 CDR And no MTVC.

08 08 15 28 CMP No MTVC. Okay, we're at 0, 0, trim. Okay.

08 08 15 36 CDR Says circuit breaker PITCH 2 - -

08 08 15 38 CMP Yeah, but I haven't started my second one. I'm going to wait and pull those after we get going.

08 08 15 41 CDR Okay.

08 08 15 42 CMP Okay, POWER to AC/DC. DIRECTs to MAIN A/MAIN B. I'm going to arm both hand controllers. Make sure yours is locked.

08 08 15 51 CDR Locked.

08 08 15 52 CMP Okay. The BMAGs are going to RATE 2.

08 08 15 54 CDR Two.

08 08 15 56 CMP Gonna PRO.

08 08 16 08 CMP Okay, the attitude is dressed up. I'm changing BMAGs and an ENTER. Okay. Gimbal drive check. John, you can go ahead and give a PRO.

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Day 9

08 08 16 25 CDR PRO.

08 08 16 28 CMP Minus 2, 0, yaw, plus 2, minus 2, 0. Trim - trims are good.

08 08 16 45 CDR Okay.

08 08 16 46 CMP Okay. Now we'll do a VERB 48 ENTER. VERB 21 ENTER. 11001 ENTER. PRO, PRO, PRO. VERB 25 NOUN 7 ENTER; 1 ENTER; 0 ENTER.

08 08 17 15 CDR Good.

08 08 17 16 CMP 509 flag is down. Okay. With 4 minutes to go, SCALE is 5/1. All right, now I'm gonna bring on MAIN Bs, number 2; go - -

08 08 17 33 CDR Go ahead.

08 08 17 34 CMP Here comes.

08 08 17 35 CDR It started.

08 08 17 36 CMP Okay. I am now going to pull PITCH and YAW BATTERY B circuit breakers.

08 08 17 45 CDR Number 2 is right.

08 08 17 48 CMP Okay. Yes, sir. Okay. Okay.

08 08 17 52 CDR Okay, ready over here.

08 08 17 53 CMP All ready on the right.

08 08 17 57 CMP/CDR All ready on the left.

08 08 17 58 CMP All ready on the - -

08 08 17 59 LMP Firing line (laughter).

08 08 18 03 CMP Okay. My RATE switch is going to HIGH.

08 08 18 06 CDR HIGH.

08 08 18 09 CMP Start the DET again at 58. No, I think I'll catch it at 57. Give it another try.

**CONFIDENTIAL**

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Day 9

08 08 18 36 LMP John, there's old Orion out there.

08 08 18 40 CDR Okay.

08 08 18 42 CMP Okay. Good, Charlie.

08 08 18 43 CDR Burn time is 2 minutes and - -

08 08 18 46 CMP Forty-two - -

08 08 18 47 CDR - - 42 seconds.

08 08 18 48 CMP Okay. And that means I go to 2 seconds overburn, and shut it down.

08 08 18 55 LMP Okay, I'll give you the normal countdown, Ken.

08 08 18 57 CMP All right, sir.

08 08 18 58 LMP Starting at about 35.

08 08 18 59 CMP That'll be just fine.

08 08 19 00 LMP Okay.

08 08 19 07 CMP Okay, the GDC looks like it's - pretty much - I'm gonna dress it up. ... has nothing to do with the uncaged gyro. It's the attitude reference. Okay.

08 08 19 35 CMP It counted that time.

08 08 19 36 CDR Two minutes. It's working now.

08 08 19 38 CMP Okay, Charlie's got the watches?

08 08 19 40 LMP Yeah.

08 08 19 46 CMP Okay, we've done everything down to here.

08 08 19 52 CDR Two jets, 17 seconds. Our A and C [?].

08 08 20 33 LMP Awful quiet, isn't it?

08 08 20 34 CDR Okay.

08 08 20 35 CMP Okay.

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08 08 20 36 LMP DELTA-V to normal.

08 08 20 37 CMP DELTA-V is going to normal. Translation control power is on. Hand controllers are in neutral; they're both unlocked.

08 08 20 46 CDR Okay.

08 08 20 47 CMP DELTA-V thrust, and the light is out. Okay, it's coming to normal.

08 08 20 56 CMP MARK.

08 08 20 57 CDR Okay. DSKY blank.

08 08 21 07 CMP Average g is running.

08 08 21 13 CDR Looks like it's counting good.

08 08 21 15 CMP Okay.

08 08 21 16 CDR Seventeen seconds.

08 08 21 17 CMP Ullage is on.

08 08 21 18 CDR ...

08 08 21 19 CMP EMS is counting.

08 08 21 20 CDR Working. Nine, 8 - -

08 08 21 25 CMP Attitude's good.

08 08 21 26 CDR - - 7, 6, 5, PRO -

08 08 21 30 CMP ENABLE.

08 08 21 31 CDR Three, 2, 1.

08 08 21 33 LMP She's open.

08 08 21 34 CDR Man, hardly move.

08 08 21 35 LMP Okay.

08 08 21 36 CDR B.

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 367

08 08 21 37 LMP ... is open.

08 08 21 38 CDR MARK B.

08 08 21 40 LMP B is open. I think it's late on the second watch.

08 08 21 45 CDR Okay.

08 08 21 47 LMP PUGS is looking good.

08 08 21 50 CDR Steer, baby, steer.

08 08 21 53 CMP Chamber pressure is riding at 98.

08 08 21 56 LMP Okay. Helium tank pressure's - I mean - tank pressure's looking great. Steady as a rock.

08 08 22 03 CMP On 30 seconds -

08 08 22 04 CMP MARK.

08 08 22 07 CDR Okay, calling 2 minutes and 8 seconds to go.  
Okay.

08 08 22 12 CMP Looks good from my calculation.

08 08 22 16 CDR EMS and  $V_T$  to go are right with each other.

08 08 22 19 CMP Okay. The gimbals are nice and steady.

08 08 22 21 CDR Okay.

08 08 22 22 CMP It's just this - Boy, you know, look at those rates. Imag - imagine what that would look like if you're - really had the thing swinging.

08 08 22 31 CDR The roll has increased - -

08 08 22 32 LMP Coming up on a minute -

08 08 22 34 LMP MARK.

08 08 22 36 CMP Okay. Chamber pressure's up to 99. Reading almost half a g.

08 08 22 45 LMP This PUGS and AUX is glitching, I guess every time it goes by a point sensor, it - -

~~CONFIDENTIAL~~ L

**CONFIDENTIAL**

08 08 22 49 CMP Yeah.

08 08 22 50 LMP - - glitches. It's okay.

08 08 22 52 CDR Yeah.

08 08 22 54 CMP Both attitudes are steady as a rock, 18 percent.

08 08 22 59 LMP Coming up on 01:30 -

08 08 23 04 LMP MARK. 01:30.

08 08 23 07 CMP Right on.

08 08 23 08 CDR Okay. We still have 2 minutes to go.

08 08 23 14 CMP Chamber pressure steady. Got a little buzz.

08 08 23 18 LMP Should be a minute.

08 08 23 23 LMP Twelve percent.

08 08 23 27 CMP Chamber pressure's increasing.

08 08 23 32 LMP Tank pressures are rock solid, Ken.

08 08 23 33 CMP Okay.

08 08 23 34 LMP MARK. Two minutes.

08 08 23 37 CMP Boy, that burn time is right on.

08 08 23 39 CDR Right on the burn time. Okay. We have less than a minute, and we're still right on.

08 08 23 43 CMP Yep. Two attitudes - -

08 08 23 45 CDR We are.

08 08 23 46 CMP - - are sitting perfect. We're up to 100 psi chamber pressure.

08 08 23 48 CDR EMS looks good.

08 08 23 49 LMP 01:15.

08 08 23 57 CMP For some reason - -

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 369

08 08 23 58 LMP 01:25 -  
08 08 23 59 LMP MARK.  
08 08 24 00 CMP - - this thing is cycling - well, it's cycling in roll. I've never seen that.  
08 08 24 03 CDR Yeah.  
08 08 24 04 LMP 01:30. 02:30 -  
08 08 24 05 LMP MARK. Thirty-five, 36, 37, 38, 39, 40, 41, 42.  
08 08 24 18 CDR SHUTDOWN.  
08 08 24 20 LMP SPS PRESSURE light.  
08 08 24 21 CMP Okay.  
08 08 24 22 LMP 41 - -  
08 08 24 23 CMP Okay. Right on.  
08 08 24 25 CDR - - 3371 point - -  
08 08 24 26 CMP Wait - wait - we've got to get the attitude stopped here. Why don't you go ahead and PRO?  
08 08 24 29 CDR PRO.  
08 08 24 30 CMP That'll put me back in narrow DEAD BAND and hold it.  
08 08 24 37 CDR Plus 0.2. Plus - plus 1.2 - -  
08 08 24 39 CMP DEAD BAND.  
08 08 24 40 CDR - - plus 1.  
08 08 24 44 CMP And after that, an attitude of 184.28, 5.82 - -  
08 08 24 49 LMP - point 1 and the drogue? What, sir?  
08 08 24 53 CMP 184.28 - -  
08 08 24 54 CDR I got it ...  
08 08 24 55 CMP - - 5.82.

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**CONFIDENTIAL**

08 08 24 56 CDR Okay.

08 08 24 57 CMP 351.69.

08 08 24 58 CDR Okay.

08 08 25 00 CMP Okay, now what's the rule say on trim?

08 08 25 01 LMP Okay, trim X and Z to less than 0.2.

08 08 25 05 CMP Okay. We got only Y.

08 08 25 06 CDR Ready. Get it.

08 08 25 08 CMP My DELTA- $V_C$  is minus 19.1.

08 08 25 11 CDR Okay.

08 08 25 13 LMP That's about right.

08 08 25 14 CMP Okay, let's get the gimbal motors off. Let me get my circuit breakers - -

08 08 25 15 LMP Go ahead. You get your breakers.

08 08 25 17 CMP Got them. MAIN B.

08 08 25 18 LMP Go.

08 08 25 19 CMP One.

08 08 25 20 LMP Good.

08 08 25 21 CMP Two.

08 08 25 22 LMP Good.

08 08 25 23 CMP And A.

08 08 25 24 LMP Go.

08 08 25 25 CMP One, 2.

08 08 25 26 LMP Good. MAIN BUS TIES coming OFF.

08 08 25 27 CMP SERVO POWER's OFF.

08 08 25 29 LMP Do you think you're in?

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 371

08 08 25 32 CDR ... two OFF. TRANSLATION CONTROL POWER, OFF. ROT CONTROL POWER, DIRECT 2, OFF.

08 08 25 35 CMP DIRECT ULLAGEs are out.

08 08 25 36 CDR Okay. Got the DIRECT - DIRECT 2 ullage on the ... powers.

08 08 25 42 CMP Okay. Circuit breakers. I'll pull them now. PITCH 1 - -

08 08 25 44 LMP TCA.

08 08 25 45 CDR Anybody get that?

08 08 25 46 CMP No.

08 08 25 48 CDR ... - -

08 08 25 49 CMP Have you got the fuels there?

08 08 25 50 CDR - - residuals.

08 08 25 51 LMP Yeah.

08 08 25 52 CMP Okay.

08 08 25 53 CDR EMS FUNCTION, OFF, and MODE to STANDBY.

08 08 25 54 CMP Yeah, I'll just leave it here because that'll keep quiet in here.

08 08 25 57 CDR ... Have you got the DIRECT ROT CONTROL, ON?

08 08 26 01 CMP Okay. I've got those two OFF; and this is back; these go to RATE 2.

08 08 26 05 CDR Okay. MAIN BUS TIES are OFF.

08 08 26 07 CMP We got those. You got the BIT RATE back to LOW?

08 08 26 09 LMP Sunrise!

08 08 26 10 CMP Okay.

08 08 26 11 LMP Okay. You got it.

08 08 26 12 CDR Check the SIM bay.

08 08 26 13 CMP All right.

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**CONFIDENTIAL**

08 08 30 58 LMP COVERS, OPEN -

08 08 30 59 LMP MARK.

08 08 31 02 CMP MAPPING CAMERA to EXTEND.

08 08 31 03 LMP MAPPING CAMERA going to EXTEND; TRACK EXTEND.

08 08 31 05 CMP Yes, sir.

08 08 31 06 LMP MARK. Barber pole.

08 08 31 07 CMP PAN CAMERA, STANDBY.

08 08 31 08 LMP PAN CAMERA, STANDBY ...

08 08 31 09 CMP STEREO - No, wait a minute - MONO.

08 08 31 12 LMP MONO, okay, go.

08 08 31 13 CMP Got the POWER to POWER.

08 08 31 15 LMP POWER to POWER. Barber pole.

08 08 31 16 CMP Okay.

08 08 31 18 LMP She's gray.

08 08 31 19 CMP All right.

08 08 31 20 LMP We'll put it to ON as soon as we get in attitude.

08 08 31 22 CMP Take the PAN CAMERA V/H OVERRIDE. See that switch?

08 08 31 26 LMP Yeah. It goes there.

08 08 31 28 CMP Okay. Put it to HIGH.

08 08 31 29 LMP Okay. Just a second.

08 08 31 34 CDR I just got three pictures of it.

08 08 31 36 LMP Hey, you got the one with the Earth in it?

08 08 31 38 CDR Yeah.

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 373

08 08 31 39 LMP Beautiful.

08 08 31 42 CMP ... Hello, there.

08 08 31 50 CDR Man, you come up like thunder. Wowie!

08 08 31 56 CMP Okay, is the mapping camera out yet?

08 08 31 58 LMP Yeah, it says barber pole.

08 08 31 59 CDR All right. The burn was nominal.

08 08 32 02 CMP Barber pole. Still barber pole.

08 08 32 05 LMP Let me get this ... before ... - -

08 08 32 07 CMP Okay. ... operate it, though.

08 08 32 09 CDR ... this book here.

08 08 32 11 CC ...

08 08 32 16 CDR Roger. The burn was nominal. We had - we just saw you rise.

08 08 32 21 CMP He already knows.

08 08 32 22 LMP We got a high - we got a high gain angle?

08 08 32 26 CMP Not until we get there. I - I think I set it.

08 08 32 28 CDR Well, what did - what did you set it to on this, Ken?

08 08 32 30 CMP On what?

08 08 32 31 CDR This camera.

08 08 32 32 CMP What are you taking pictures of?

08 08 32 33 CDR ... the Earth, and then me.

08 08 32 36 CMP 1/250, f/8.

08 08 32 41 LMP There's OMNI Delta.

08 08 32 43 CDR Charlie, what's that result again?

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**CONFIDENTIAL**

08 08 32 45 LMP I'm just about pitch and roll.

08 08 32 47 CDR Oh.

08 08 32 49 CMP When we get to attitude, it'll be PITCH, 45; and YAW, 320. It's set. I don't see how that's gonna work; it's not looking at the Earth. ...

08 08 32 59 CDR Me, either. What is it? Just targets of opportunity out through there?

08 08 33 06 LMP Man, we are climbing out.

08 08 33 21 CDR Do you read us now, Don?

08 08 33 26 CC ...

08 08 33 28 CDR Roger. We just saw you come up like thunder, and that's how we're coming up. Just going away from it like - nothing.

08 08 33 36 CMP Hey, look at that beauty out there. Isn't that something? It's ... - -

08 08 33 39 LMP It's better than an AB climb, Pete.

08 08 33 42 CMP Okay, Charlie, how about the mapping camera. Is it out yet?

08 08 33 47 CDR You have the burn status report, Charlie?

08 08 33 48 LMP Yeah, it's out.

08 08 33 50 CMP Okay, would you put the MAPPING CAMERA to ON?

08 08 33 52 LMP MAPPING CAMERA's going ON, right.

08 08 33 54 CMP Okay, PAN CAMERA to OPERATE.

08 08 33 55 LMP OPERATE.

08 08 33 56 CMP ...

08 08 33 57 LMP That came off.

08 08 33 58 CMP Okay, IGAME MOTION to INCREASE.

**CONFIDENTIAL**

08 08 34 00 LMP Okay.

08 08 34 01 CMP ... plus 2.

08 08 34 02 LMP ... - -

08 08 34 03 CMP You have - -

08 08 34 04 LMP - - ... barber pole plus 2?

08 08 34 05 CMP You said it. One -

08 08 34 07 LMP Barber pole. One - Got it.

08 08 34 11 CMP Okay, have you got the PAN CAMERA to V/H ...?

08 08 34 14 LMP Yeah.

08 08 34 15 CMP Okay, I'll pick you up the status report. Why don't you get this one? It's all on the same page here.

08 08 34 19 CDR Okay. Okay, that's right.

08 08 34 21 CMP Then I'll get one.

08 08 34 22 CDR Okay, Houston. We're working some mapping stuff. The burn was completely nominal. We'll give you the status report in - just as soon as we finish here.

08 08 34 32 LMP Look at that horizon thing, would you, you guys!

08 08 34 36 CDR Wonder if I can get that DAC on this thing.

08 08 34 38 CMP Yeah, why don't you get the status report; I'll try to get the DAC going.

08 08 34 41 CDR Okay.

08 08 34 42 LMP John, ...

08 08 34 44 CDR Here. Take the pictures, Charlie.

08 08 34 46 LMP Roger. Give me a window.

08 08 34 55 CMP Okay, I think we can get it out of that one.

**CONFIDENTIAL**

Day 9

08 08 34 57 LMP Try the f/8, that one? Hold me.

08 08 34 59 CMP Okay, now don't - don't stop it down any more.

08 08 35 02 CDR Okay, Houston. Burn status report follows. There is no DELTA-T<sub>ig</sub>. Burn time, 242.4. There was no trim. And the residuals were measured at 184, 005, and 351 degrees; 0.2, V<sub>gx</sub>; 1.2, V<sub>gy</sub>; 0.1, V<sub>gz</sub>; all pluses; minus 19.1 DELTA-V<sub>C</sub>. Which was the fuel and which was the oxidizer, Charlie? 3.9?

08 08 35 45 LMP The -

08 08 35 49 CDR 3.9 is the oxidizer and 5.2 is the fuel.

08 08 36 00 LMP Man, did that beauty feel good! Ah! Must admit I feel good enough to ... - -

08 08 36 05 CDR Hey, Charlie, beautiful! That baby just humped right out of there. She can really put on the power. It's - it's kind of refreshing to get a whole half a g from her.

08 08 36 17 CMP How about let me use the center window for a second?

08 08 36 24 CDR The boys are all at the window taking pictures.

08 08 36 28 CMP Get a pan.

08 08 36 29 CDR We got - we got some pictures of earthrise as we were climbing out. I bet they're really spectacular.

08 08 36 45 CDR This Moon is really - is really a fascinating satellite. Boy, there's something new and different, and - and you can sure see a lot of variety from this view right here. This is almost - -

08 08 37 00 LMP Look at that!

08 08 37 01 CDR This is even more spectacular almost than the Moon - than the Moon in earthshine when we're coming in here just - -

08 08 37 06 CMP Boy, you can see old Neper and all that stuff.

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 377

08 08 37 09 CDR - - 5 days ago, or however long ago it was.

08 08 37 13 LMP Let's see, am I looking north or south here, Ken?

08 08 37 16 CMP North is that way.

08 08 37 17 LMP Okay. I'm looking north. This is beautiful! You really get the idea it's a planet. It's just a -

08 08 37 28 CMP Look over here.

08 08 37 30 CDR I think the general agreement in the cockpit is that morale around here just went up a couple of hundred percent.

08 08 37 45 LMP Hey, are we in SIM bay attitude?

08 08 37 47 LMP Yes, sir.

08 08 37 48 CDR Got to have the high gain.

08 08 37 51 CMP (Laughter) How can I come around with a POO?

08 08 37 56 LMP ...

08 08 38 00 CMP Can't believe that'll work yet.

08 08 38 09 LMP ...

08 08 38 10 CMP Okay, I'll let you back at the -

08 08 38 12 LMP Yeah, I can get that ...

08 08 38 13 CMP Thank you.

08 08 38 15 CDR Hey, Houston, how do you read on the high gain? Okay, I missed your last thing; we're switching over.

08 08 38 38 CDR We're now getting a view of - on the horizon, and there's Crisium. Way up north there, Charlie.

08 08 38 56 CMP Hey, Charlie, be sure you get the florals [?] down there.

08 08 39 00 LMP Right down there? Yeah, that's what I been doing.

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**CONFIDENTIAL**

08 08 39 02 CMP No, wait a minute. No - -

08 08 39 03 LMP I didn't see anything.

08 08 39 04 CMP I don't think that's what I'm talking about.

08 08 39 05 LMP Right down here?

08 08 39 06 CMP This stuff over here. All those - take a strip that runs right out through here.

08 08 39 11 LMP Okay.

08 08 39 12 CMP And - -

08 08 39 13 LMP Oh, yeah, yeah. I see it.

08 08 39 14 CMP That stuff?

08 08 39 15 LMP Uh-huh.

08 08 39 16 CMP And - Yeah, it does keep on coming down here.

08 08 39 17 LMP Yeah.

08 08 39 18 CMP You can take a strip starting at the top of it and then come all the way to the bottom.

08 08 39 20 CDR You want a VERB 58?

08 08 39 24 CMP Is that what he said?

08 08 39 25 LMP I don't know.

08 08 39 27 CDR What does that do?

08 08 39 30 CMP Oh, I guess I didn't stop it in time.

08 08 39 34 CDR Didn't stop it in time?

08 08 39 36 CMP I'm going - going to attitude. And - ... That's the problem with that program.

08 08 39 45 CDR What's that?

08 08 39 46 CMP That thing goes off to - to play with itself and then you maneuver at - at 15-minute maneuvers; but

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you got 8 seconds at the end. If you don't hit PRO on it, it stops right there and it won't keep the rate drive going.

08 08 39 58 CDR No, but you have to watch it; it's okay.

08 08 40 00 LMP That's just spectacular!

08 08 40 02 CMP Well, I told you if you watch it. But you got to sit there and watch it. Which I ain't - guess I haven't - -

08 08 40 06 CDR At 10-minute intervals?

08 08 40 08 CMP Huh?

08 08 40 09 CDR At 15-minute intervals?

08 08 40 10 CMP No, if it takes you 15 minutes to get into attitude - -

08 08 40 12 CDR Oh, by then you got to - you got to hit the maneuver when you get there. Yeah.

08 08 40 16 CMP Whenever it gets through with this, 10 seconds or 15 minutes.

08 08 40 18 CDR Yeah.

08 08 40 19 CMP You got 8 seconds grace.

08 08 40 24 CDR Should give you a tone warning or something.

08 08 40 26 CMP Yeah.

08 08 40 27 CDR Look at that. Isn't that something, you guys?

08 08 40 30 CMP It really is.

08 08 40 31 CDR It is really - -

08 08 40 33 CMP I don't care. I'm sorry E.V. [?] isn't getting his pictures. To heck with that. (Laughter)

08 08 40 37 CDR Go ahead. I wish we had ...

08 08 40 39 LMP Hey, Pete, this is really a spectacular view. Wait until I get the camera clear.

**CONFIDENTIAL**

08 08 40 47 CDR Yeah, the old crescent Earth coming up there.

08 08 40 49 LMP Boy, look at it. There's old King right down there, the old crab.

08 08 40 53 CMP See it?

08 08 40 54 LMP Yeah, I can see it.

08 08 40 56 CDR The - the earthrise was just beautiful, and it just - -

08 08 41 00 LMP Well, you look like ...

08 08 41 01 CDR - - came up like gangbusters. We were looking right out the window - -

08 08 41 02 LMP Right down here.

08 08 41 03 CDR - - and there you came, and right now - -

08 08 41 05 LMP ... are?

08 08 41 06 CDR - - you're a - almost a - just a crescent Earth, just a very sliver out there. And I tell you, we can hardly wait. I know we got a couple of things to do before we get there, but we're looking forward to it.

08 08 41 23 LMP Did you tell them about sunset?

08 08 41 25 CMP What about sunset?

08 08 41 27 LMP I - I mean earthset? Did you tell him about that? No?

08 08 41 30 CDR No. What about it?

08 08 41 31 LMP I - I just want to try it.

08 08 41 33 CDR Tell him.

08 08 41 34 CMP Earthrise. Take a look now.

08 08 41 37 LMP Houston, another great view that we had right before TEI was your - your prime earthset. Your crescent was - your - the lit - light crescent of

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~ AL

Page 381

the Earth was tangent to the lunar horizon. And, as you went down, you ended up looking like a - -

08 08 41 55 CMP I bet you'd like ...

08 08 41 56 LMP - - big bull horns up there.

08 08 41 59 CDR Look at all those swirls.

08 08 42 02 CMP Yeah, why don't you get some of those? I -

08 08 42 05 LMP I have made it.

08 08 42 06 CDR Thanks.

08 08 42 11 CMP HIGH GAIN to AUTO.

08 08 42 14 CDR Got to have it. I don't think that thing's gonna work. It's beeping.

08 08 42 22 CMP That's the antenna. Well, increasing rate. Isn't it?

08 08 42 27 CDR It's like a billiard ball. That's what people can't understand, how flat and round it -

08 08 42 34 LMP And my TSB has got a red stripe on it. Will you put some water on it and - and throw it across, please? Just - -

TIME SKIP

08 11 14 52 LMP - - LMP on Apollo 16 has been wearing for the last - well, ever - all the way out and all the way back.

08 11 15 05 LMP If y'all get tired of looking, you can just cut off the lines or go to COMMAND RESET or something.

08 11 15 17 CMP Huh?

08 11 15 22 CDR One final shot of the beautiful Moon.

08 11 15 42 CC Say, Charlie, why don't you try to give us a close-up of each guy and maybe we can get a playback for the wives tomorrow.

~~CONFIDENTIAL~~

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08 11 15 49 LMP Okay, we'll do that.

08 11 15 54 CDR You want - you want ...

08 11 16 06 LMP I think if we get in the LEB ...

08 11 16 08 CMP ... always work ...

08 11 16 17 CDR That ain't ...

08 11 16 18 LMP Okay, we got it off. We'll turn - bring it up in just a second.

08 11 16 42 CMP All right, you guys. ...

08 11 16 59 LMP (Laughter) ... Boy, you know, I think this is ... picture.

08 11 17 07 CDR Huh?

08 11 17 09 LMP Huh?

08 11 17 22 CMP ...

08 11 17 24 LMP I know it. (Laughter)

08 11 17 25 CDR ... like that, you could go all over the country.

08 11 17 30 LMP ... Flight Plan right in front of you.

08 11 17 31 CMP Yeah, ...

08 11 17 32 LMP Are you?

08 11 17 34 CMP Huh? Yeah, I'm trying ... (laughter).

08 11 17 36 CDR Oh, yeah. Don't want to waste any time.

08 11 17 45 LMP This is the relaxing attitude for the well - for the seasoned space traveler.

08 11 18 01 LMP Boy, I can hardly believe the last - 3 days, Pete. That was - yeah, these Cayley Plains was really the most fascinating place I've ever been in my life and will ever hope to go, and we sure had a good time collecting all the rocks.

08 11 18 26 CDR Shift.

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08 11 18 27 LMP Yeah. Okay, let you look at somebody else now.

08 11 18 38 LMP (Laughter) You - you say? What - what was that?

08 11 18 46 CMP ...

08 11 18 50 CDR (Laughter) Okay.

08 11 18 53 LMP That's great. He said everybody in the MOCR has been interpolating but the Surgeon; he's standing on his head.

08 11 18 59 CDR (Laughter)

08 11 19 04 CMP Hey, tell him ...

08 11 19 08 LMP Okay. Ken just turned the camera over. You can have him - turn the other way now. Then maybe the rest of you will stand on your heads.

08 11 19 39 CDR Are you transmitting? Okay. I don't know if you can see this or not. See this dirty hand? Can you see that? Can you see the dirt under those fingernails - can you see the dirt under those fingernails? That's Moon dust. You talk about a - you talk about two dirty human beings. It took 10 minutes before we could get Ken to open the door. As soon as he saw us, he wanted to close it. And - and we're still that way. Yeah, wait until you see some of these rocks and we - and some of the data that Ken's got. That's really something. That's the - the Moon around Alphonsus. I got a chance to look at it today for the first time, and - it's really - it's really a strange place. How's everybody doing down there in MCC? Is - is everybody starting to take it easy for a change?

08 11 20 48 CC Oh, I think we're all breathing easy now. And if we can, we'd like to get a quick look at the CMP because we're going to have to give up the lines here in a couple of minutes.

08 11 20 55 LMP Yeah. Okay, will do.

08 11 21 08 CDR Excuse me, Ken.

08 11 21 11 CC The only - the only really neat guy on the crew.

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**CONFIDENTIAL**

Day 9

08 11 21 14 LMP Huh? ...

08 11 21 16 CDR ...

08 11 21 22 LMP What did you say? You must be blind.

08 11 21 28 CDR He does dress pretty well.

08 11 21 30 LMP Notice the reflection off the bald head?

08 11 21 42 LMP Did the Surgeon do a back flip on that one?

08 11 21 49 CC Negative. He's not agile enough.

08 11 21 57 CMP Ken doesn't look like he is either.

08 11 22 02 CDR (Laughter) I tell you, in a J-mission spacecraft, you either - you either have to be a midget to do that, or have thought about it a lot before you try it.

08 11 22 17 LMP Okay. We're - we're gonna sign off here. Here comes the lens cover.

08 11 22 28 CC Okay, thanks a bunch, guys. We'll be talking to you again in a minute.

08 11 22 30 LMP Okay. Thanks, Pete. We'll go back to SCI on the S-BAND AUX.

08 11 22 45 CC Okay. And for thermal reasons, as soon as you can, we'd like to go on now and get into PTC.

08 11 22 50 LMP All right. We'll start up.

08 11 22 52 CDR We're for that.

08 11 22 57 LMP ..., Ken.

08 11 22 58 CDR Let me move out of here, T.K. Okay. What'd you have?

08 11 23 08 LMP What's happening down on Earth?

08 11 23 14 CC Say again, Charlie?

08 11 23 18 LMP You got any newsy items for today?

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08 11 23 24 CC No, I guess we don't have anything going on right now, Charlie.

08 11 23 29 LMP One mom - Is that what you want, Ken?

08 11 23 32 CC Everything's routine. If you want a news report, we can dig one up, I think.

08 11 23 38 LMP No, it's not important. Wondered what - we hadn't had an update in a while. Y'all must have ran out of pa - -

TIME SKIP

08 14 51 48 CDR How's everybody doing down there at MCC?

TIME SKIP

08 20 51 23 CDR Yes, sir.

08 20 51 25 CMP Thank you.

08 20 51 35 CDR I really slept good last night. Really did.

08 20 51 37 CMP Boy, I did. (Laughter)

08 20 52 03 LMP ...

08 20 52 05 CDR By the time we get ready, we - we've got to go back and land. Of all the dumb things (laughter).

08 20 52 11 CMP That's about right.

08 20 52 25 CMP Hey, how about hitting the GAMMA RAY, SHIELD OFF, once you're in? Let's see, I guess we aren't in yet, though.

08 20 52 38 CDR It's in work.

08 20 52 39 CMP Okay.

08 20 52 43 CC Apollo 16, Houston.

08 20 52 45 CMP Hello.

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**CONFIDENTIAL**

08 20 52 50 CC Roger. For your information, old Mother Earth's got you now, and you're coming home.

08 20 52 56 CMP Well, that's nice to know.

08 20 52 57 CDR Hey, Hank - -

08 20 52 58 CMP How about some words - -

08 20 52 59 CDR - - it had us last night.

08 20 53 06 CMP How about some words on the midcourse 5?

08 20 53 07 CC Roger. We're just now showing you crossing under the Earth's in - sphere of influence.

08 20 53 15 CDR ...

08 20 53 16 CC Roger. Midcourse 5 will be about 4 feet per second. It'll be an RCS burn.

08 20 53 22 CMP Roger.

08 20 54 39 CMP Did we - we didn't turn the mapping camera on, did we?

08 20 54 41 CDR No. You want that turned on?

08 20 54 43 CMP Just a second, let me find it here. It's presently off, right?

08 20 54 51 CDR Yeah.

08 20 54 52 CMP There's a place in here where it says turn it off, and then some place it says turn it on.

08 20 54 56 CDR Well, that's just something - maybe you could clear it up.

08 20 54 58 CMP No, I found something in the Flight Plan where I turn it off. Hank, would you say again what you wanted done with the mapping camera, please?

08 20 55 11 CC Roger, Ken. We just want to run the film out and leave the door shut. We want to get the IMAGE MOTION, ON; MAPPING CAMERA, ON; and barber pole plus 2. That gives us a higher speed.

**CONFIDENTIAL**

Day 9

Page 387

08 20 55 24 CMP Okay. We'll leave this in the center position, then. Okay; the MAPPING CAMERA, ON; top switch.

08 20 55 33 CDR ON.

08 20 55 34 CMP Yes.

08 20 55 36 CDR I should move the switch and all of a sudden it went barber pole - -

08 20 55 38 CMP It's looking great. The IMAGE MOTION did that.

08 20 55 41 CDR Okay; and we go to ON.

08 20 55 43 CMP Okay. Now, take the switch below - this one. It's momentary. Get it up until you get barber pole.

08 20 55 56 CDR There you go.

08 20 55 57 CMP Okay; now two more.

08 20 55 58 CDR One, two.

08 20 56 00 CMP Okay.

08 20 56 18 CC And, 16, Houston. Whenever you get a chance, we'd like to get yesterday's crew status and today's crew status report.

08 20 56 25 CMP Okay. That's in work now, Hank.

08 20 56 34 CDR I tell you, let's tell them this about PRDs: we'd like to put that off until we can ... up to date ... stand there ... PRD ... Sure it's down there, Charlie?

08 20 56 50 LMP ...

08 20 56 57 CDR Okay. ... just reading ...

TIME SKIP

08 21 00 15 CMP You remember reading about that ...?

08 21 00 19 LMP Yeah.

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08 21 00 21 CMP These were not on board.

08 21 00 25 CDR Well, I wouldn't worry about it.

08 21 00 29 LMP ...

08 21 00 39 CDR That's where I hid a ..., wasn't it? Yeah.

08 21 00 50 CDR ...

08 21 00 57 CMP Gingerbread?

08 21 01 02 CDR ...

08 21 01 11 LMP ...

08 21 01 14 CMP Yeah, I guess we better. How about if I get a P52 in there before you pull up that Boyd?

08 21 01 21 CDR ...

08 21 01 22 CMP No.

08 21 01 24 CDR ...

08 21 01 26 CMP I can't believe how well it ... Man, I must have gotten 7 hours of sleep. I can't believe it.

08 21 01 48 CDR ...

08 21 01 55 LMP ... on there a while.

## TIME SKIP

08 21 11 06 CDR Seven hours, good sleep. Num - A-4: none. Day 9: still skip the PRD reading for the same reason; 6-3/4 hours, good sleep. A-4: none. On the CMP, day 8: B-1, 15059; B-3, 5.5, good sleep; B-4, none. Day 9: B-1, 1564; B-3, 7 hours, good sleep; B-4, none. On the LMP, day 8: skip the PRD - the suit was out of the way then - C-3, 7 hours, good sleep. C-4, none; and Charlie remembered to get his PRD reading - reading machine out today, and C-1 is 21143; C-3, 7 hours, good sleep; C-4, none.

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08 21 13 10 CMP Did you have comm there at all? It sounds like you lost him.

08 21 13 14 CDR Did we lose you during any of that, Hank?

08 21 13 22 CC Negative, John. We got it all.

08 21 13 24 CDR Okay. Now on to the menu. We'll get back to the - to good old Casper here. We're working on day 8, meal C. And for the CDR, substitute hamburger for beef and gravy and scratch the gingerbread. And for day 9, meal A: scratch the peaches and the grits. Day 9, meal B: scratch the hamburger and add meatballs with sauce. For day 9, meal C: scratch the pecans.

08 21 13 46 CDR And for the - for the CMP - What did you eat on A-1 and B what - A and B?

08 21 15 00 CMP Huh?

08 21 15 01 CDR Did you eat anything on A and B? The first 2 days in that thing?

08 21 15 05 CMP Shoot, I don't remember.

## TIME SKIP

08 21 38 32 CDR Okay, I'll agree with it.

08 21 38 34 LMP Why don't we get the - -

08 21 38 35 CMP You leave my pencil with it?

08 21 38 37 LMP Yeah. And we got this burn coming up before we eat.

08 21 38 40 CMP Yep. Yeah, I can do that while you're eating.

08 21 38 48 CDR ...

08 21 38 50 CMP Huh? That RCS?

08 21 38 54 LMP Yeah.

08 21 38 55 CDR Yeah.

**CONFIDENTIAL**

08 21 38 59 LMP I think something ...

08 21 39 01 CDR Is that right? ...

08 21 39 08 LMP I guess they are? ...

08 21 39 09 CDR ... about it. I - I had to put mine up in ...

08 21 39 30 LMP Ken, you got to get off my bag. Ken, whoa, Ken.

08 21 40 02 LMP (Laughter) All night long with no biomed.

08 21 40 05 CDR I sure had it plugged in. I had it plugged in the night before last, too. I don't understand that.

08 21 40 32 LMP ... get that up ...

08 21 40 40 CDR Okay. Well, why didn't you tell me, I could have changed this sensor out - this - It's probably in this box here, don't you reckon?

08 21 40 54 CMP Well, here's a spare - -

08 21 40 55 CDR Yep.

08 21 40 56 CMP - - ...

08 21 40 57 LMP ...

08 21 40 58 CMP They're about - -

## TIME SKIP

08 22 06 46 CMP - - you guys.

08 22 06 47 LMP ..., Ken?

08 22 06 52 CMP I didn't notice.

08 22 07 13 CC How big is the Moon this morning?

08 22 07 19 CMP Haven't gotten around to looking yet, Hank.

08 22 07 34 LMP Think we ought to tell the docs we - I'm using some of this skin cream? For this dryness? On my arms?

**CONFIDENTIAL**

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08 22 07 44 CMP Want to?

08 22 07 46 LMP Well, I mean they'd be real pleased.

08 22 07 48 CMP You're gonna start something. Are you sure you want to finish it?

08 22 07 52 LMP What do you mean, Ken?

08 22 07 53 CMP You're gonna start a long discourse with those guys. They're gonna want to know what it is, describe it to them and - -

08 22 07 58 LMP I tell you it's nothing on my arm - I'll tell them it's nothing.

08 22 08 02 CMP Well, okay; but just - just be prepared to - It's not a simple thing of saying, I'm doing this.

08 22 08 06 LMP Yeah, they're - Okay.

08 22 08 10 CMP I think you're probably doing the right thing, but beware.

08 22 08 16 LMP They've - they got -

08 22 08 18 CMP Yeah.

08 22 08 19 LMP They get upset when there's just medication gone.

08 22 08 22 CMP Yeah.

08 22 08 23 LMP And we haven't told them about it.

08 22 08 24 CMP Yep.

08 22 08 25 LMP So I put it on my cut.

08 22 08 28 CMP They're gonna want -

08 22 08 30 LMP They're gonna want to know why you didn't report your cut.

08 22 08 32 CMP Yep. It's - Let's see, I don't know which side the Moon is on, ... do is look. In fact, I'll tell you what I'll do. When we get there, is I'll ask the computer where the Moon is. It knows. It knows everything.

**CONFIDENTIAL**

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08 22 08 50 LMP Ah, yes.

08 22 08 53 CMP Sees all; tells all. My own version of-Hal.

08 22 09 22 LMP There it is, right out the hatch window, on this side. See it, John? If you hold a silver dollar up to the window, it might cover.

08 22 09 38 CMP Okay; that small? Aw, the stinker.

08 22 09 42 CDR No, it's probably bigger than a silver dollar.

08 22 09 46 LMP I bet at arm's length it -

08 22 09 51 CDR Yeah, it's a little bit bigger - no, it's a little bit smaller than a silver dollar.

08 22 09 54 CMP Yeah, it's smaller.

08 22 09 57 LMP At arm's distance.

08 22 10 07 LMP Fifty cents?

08 22 10 09 CDR Fifty-cent piece, yeah.

08 22 10 11 CMP ...

08 22 10 22 CDR Well, feels like we're about - -

08 22 10 24 CMP If you really want to be precise, we'll check the distance, and you can give them a ratio. And then they'll really think you're smart. They'll think that's a bunch of ...

08 22 10 34 CDR Okay, Hank at - at arm's distance, if you cup your fingers around it, it's about as big as a 50-cent piece. But you can sure tell that it's changed size for the smaller, but we still feel like we're pretty close to it. Like I - I don't how far away from it we are, but probably about maybe 25 - 30,000 miles.

08 22 11 05 CMP Fifty-three.

08 22 11 07 CDR No, Ken tells me 53. That's why they let the computer run it.

08 22 11 16 CC Roger. We show you about 30,000.

**CONFIDENTIAL**

Day 9

~~CONFIDENTIAL~~

Page 393

08 22 11 18 CDR 30,000? Okay.

08 22 11 20 CMP Couldn't be. Look at that; 187,000?

08 22 11 24 CC Take it back; they rewrote about 38,000.

08 22 11 26 CDR Okay.

08 22 11 28 CMP EECOM. The Flight Plan's wrong, then.

08 22 11 35 LMP Well, now, we - Yeah.

08 22 11 44 CMP That 30,000 here is still in my lunar - lunar sphere, aren't you?

08 22 11 47 CC - - we'd like for you to bring up the high gain, and you're there.

08 22 11 51 CDR Roger.

08 22 11 56 CMP I don't understand that.

08 22 11 59 LMP What are the angles?

08 22 12 02 CMP Minus 90 and 285.

08 22 12 08 LMP For some reason ... only got ...

08 22 12 12 CMP Oh, is that right? Oh, I thought it was 240. That's where I missed it.

08 22 12 18 CDR Yeah.

08 22 12 19 LMP ...

08 22 12 25 CDR It's minus 90 and ...

08 22 12 27 CMP 285. Let's see, did we put the shield back on?

08 22 12 35 LMP Yeah.

08 22 12 38 CMP Okay. How about looking at the repress package and tell me if it's repressed.

08 22 12 48 CDR It's repressed.

08 22 12 49 CMP We're gonna - -

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08 22 12 50 LMP Can't get the - -

08 22 12 51 CMP We're gonna use it. Well, I've got minus 90 and 171. Of course, that's the center of the Earth. Mine may be over on a limb. Boy, that's a big discrepancy. There's no way that y'all can - Well, at minus 90, it doesn't matter. That's right.

08 22 13 17 LMP ...

08 22 13 19 CDR ... problem on that ...

08 22 13 23 CMP Okay. Let's do it; avoid the gimbal problems.

08 22 13 26 CDR Yeah.

## TIME SKIP

08 22 58 51 CMP - - ... Let me do it.

08 22 58 52 CDR No, I'll do it.

08 22 58 53 CMP ...

08 22 58 56 LMP ... orange juice.

08 22 58 59 CDR I'd like some orange juice, too. There isn't any.

08 22 59 24 LMP Anybody want a fruit cocktail right now? I got two of them in my TSB ...

08 22 59 57 CDR ... some orange juice?

08 23 00 00 LMP ... hot water ... cold.

08 23 00 02 CDR No. Cold water. That's what I'm saying. I wouldn't do that unless you like hot water in your cereal. I know you don't like it in your orange juice.

08 23 00 42 CDR Try it and be quiet.

08 23 00 52 CMP Oh.

08 23 01 17 CMP Golly!

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08 23 01 20 LMP What'd you do?

08 23 01 21 CMP Oh, boy. All over (laughter). Gosh.

08 23 01 31 LMP ...

08 23 01 41 CMP Oh, look at that. Hey, I'll tell you what would be a good idea.

08 23 01 47 CDR What?

08 23 01 48 CMP Planning purposes, while you got food open, is to stick a couple of juice bags into the - in somebody's TSB for post-EVA. Because it's going to be awhile after that before we get around to getting unsuited and all that jazz.

08 23 02 00 CDR Okay. ...

08 23 02 03 CMP Well, okay. I was going to stick my juice bag in there for post-EVA or maybe for a - a pre-EVA last drink. No. I won't do a post-EVA - Stick it in my bag. Okay; where's our trash?

08 23 02 28 CMP Is our trash bag right down there? Yeah. How about the pills?

08 23 02 41 CMP Got the pills down there, John?

08 23 02 43 CDR Yep.

08 23 02 49 CMP Oh, boy. Well, I'll say one thing, coffee up your nose clears out your sinuses.

08 23 02 55 CDR That right?

08 23 02 59 CMP Darn silly way to do it. I think I'm getting the hang of these pills. That gets to be fun. Okay, I take it - if you guys could -

08 23 03 25 CDR What do you need?

08 23 03 26 CMP Well, ... there's no way we can get ahead. Then we got to do it anyway. Defecate.

08 23 03 31 LMP No. Uh-huh. Hank, 16.

08 23 03 35 CC Go ahead.

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08 23 03 40 LMP Okay; that bat B charge is underway, and we've been watching this battery compartment. We're back up to 2 now.

08 23 03 54 CC Roger. Copy.

08 23 03 59 CDR 1.8, Charlie.

08 23 04 01 LMP Well, okay. I'm sorry. It's still climbing.

08 23 04 13 CDR No, it's important, though. It's only 1.82. Great difference as far as pressure is concerned if it fails. ...

08 23 04 22 LMP Come on! Uh-oh.

08 23 04 28 CMP What's the matter now?

08 23 04 29 LMP My sausage got off my spoon.

08 23 04 32 CMP Oh, I thought you had something major.

08 23 04 34 CDR ... how you eat that. Don't handle it, Charlie.

08 23 04 36 LMP Well, I couldn't squeeze it out of there, John.

08 23 04 38 CDR Couldn't, huh?

08 23 04 39 LMP Unh-uh.

08 23 04 43 CMP That's amazing. Something's screwed up here.

08 23 04 46 LMP Try it on the - I know it - try it on the - -

08 23 04 49 CMP WIDE BEAM.

08 23 04 50 LMP - - WIDE, to start - to start with. Start on WIDE.

08 23 04 52 CDR But look at that, NARROW. You should - There is something wrong with the beam switching.

08 23 04 57 CMP ... better signal ...

08 23 05 06 CMP It ain't working. Man, I'm glad as long as that - -

08 23 05 09 LMP I got it. I got it. It's working.

08 23 05 11 CMP Glad -

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08 23 05 14 CDR ...

08 23 05 24 LMP Here it comes.

08 23 05 25 CMP Yeah, but it - it's not working. Yet this works like a - Hank, I don't really know what's going on with our antenna. It's - I get you the best signal strength by going to MANUAL and NARROW. And every time we switch to either AUTO or REACQ, why, it seems to break - break some kind of a beam switch, lock, or something. And we tried going to MANUAL and WIDE and then working it through REACQ and then bringing it down and things. That doesn't help any. Would there be any future in trying secondary electronics, the servos? Think it's in the antenna electronics itself. Which one you going to fix?

08 23 06 07 CC Okay; INCO says we're just right on the line there. Why don't we just leave it in MANUAL and NARROW?

08 23 06 16 CMP Okay.

08 23 06 17 CDR All right, who's the guy stole my sugar?

08 23 06 19 CMP Oh-oh. I didn't know you were going to eat that. I'm sorry.

08 23 06 24 LMP It's already reconstituted.

08 23 06 26 CMP Was it? I don't think that's a purely reconstituted, what's in there. There's a - that - that hasn't reconstituted.

08 23 06 34 LMP No.

08 23 06 35 CDR Well, Charlie, I don't need it. Here's another one.

08 23 06 38 CMP And it ain't reconstituted. That's all I threw in there, honest.

08 23 06 42 LMP ...

08 23 06 43 CMP I did not, Charlie. But you may reconstitute this one.

08 23 06 49 LMP That ... reconstituted.

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Day 9

08 23 06 58 CMP You know, I think we - you know, I planned to use this bag because I thought we had about 3 days on it. Now, I'm gonna throw it away, and we got - -

08 23 07 05 CC ... I'd appreciate it if from time to time, you'd just give me an idea where you are in the checklist.

08 23 07 10 CMP We is at the eat period.

08 23 07 15 LMP Ken, I don't think we ought to stow that big bag; that's not hardly much in that big one. We ought to do the small one.

08 23 07 20 CMP That's what I was thinking about; putting this into something else.

08 23 07 22 LMP That's right. We need this; we don't need that.

08 23 07 25 CMP We'll be ready to start into that checklist in probably about 10 minutes or so. And it just didn't seem like it was proper to - to go ahead and press on the rest of the day without stopping for something.

08 23 07 39 CC ... terminate that battery B charge and keep an eye on that thing. If it gives - gets above 3, give us a call.

08 23 07 51 CMP Okay. Why don't you call us back in about 30 minutes and ask us to look at it, because that's not the kind of position where we can keep an eye on it without making a conscious effort at it.

08 23 08 03 CC Okay; we'll give you a reminder, and - -

08 23 08 06 CDR There you go, Charlie.

08 23 08 07 CC - - ... we're gonna want to vent it again back down to 1.

08 23 08 11 LMP Okay; do you want to vent it now? It's at 2.

08 23 08 18 CC Negative. They want to see if it'll stabilize.

08 23 08 21 LMP Okay. You've got - the bat B charge is terminated, and we'll watch the battery's compartment pressure.

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08 23 08 31 CMP (Singing) Do-dee-do-dee-dah-dum. Let's see what's a good - We got one more of those plastic bags - overwrap bags in - in your TSB, John. Haven't we?

08 23 08 44 CDR I don't remember seeing it there yesterday.

08 23 08 46 CMP I don't remember seeing it either, but - -

08 23 08 47 CC While you're eating there, I'll tell you a little ... news. The Astros have ... they are tied for first place in the division.

08 23 08 56 CDR Well, that's outstanding. Congratulations!  
(Laughter)

08 23 08 59 CMP That is a first. Maybe we could make a little presentation - to Biafra - as we throw the bag out. On behalf of CSD, Rita Rapp, all Medical Directorate, all you starving people of Biafra, we're throwing away - 1 month's supply of food for the Trojan Army.  
(Laughter)

08 23 09 31 CDR What'd you say we're looking for here? A ...?

08 23 09 33 CMP You remember that - that plastic bag like we ... the last day of the LM - threw the LM? There were two of those left over.

08 23 09 42 CDR Yeah.

08 23 09 43 CMP You can't find them?

08 23 09 44 CDR Here it is.

08 23 09 45 CMP Okay. Let's see if I can transfer this stuff into it and save this bag, because this is a big - this is a good bag for trash. We got another - we got a ways to go yet.

08 23 09 57 CDR Gonna transfer all this stuff in here into it?

08 23 09 59 CMP Yeah.

08 23 10 02 CDR I don't think you can make it work, man. There's a lot of trash in here.

08 23 10 06 CMP Well -

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08 23 18 54 LMP Okay, I'll give you a normal countdown, Ken.

08 23 18 57 CMP All right, sir.

08 23 18 58 LMP Starting at about 35.

08 23 18 59 CMP That'd be just fine.

08 23 19 00 LMP Okay.

08 23 19 06 CMP Okay, the GDC looks like that's pretty much - but I'm gonna dress it up.

08 23 19 11 CDR ATT 1, RATE 2. ...

08 23 19 15 CMP Has nothing to do with the uncaged gyro. Okay. Attitude reference. Okay.

08 23 19 35 CMP It gimbaled that time.

08 23 19 36 CDR Two minutes. It's working now.

08 23 19 37 CMP Okay. Charlie's got the watches?

08 23 19 39 LMP Yep.

08 23 19 46 CMP Okay. We've done everything down to here.

08 23 19 51 CDR That's two jets, 17 seconds. IMC.

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## DAY 10

09 00 17 44 LMP What about this urine bag? We gonna save this?  
You want me to put it in the jett bag?

09 00 17 52 CDR Don't need it.

09 00 17 53 LMP Huh?

09 00 17 54 CDR Don't need it.

09 00 17 55 LMP Well, we might need a trash bag, John.

09 00 17 58 CDR That ain't true, Charlie.

09 00 18 06 CMP ... What about ...

09 00 18 08 CDR Okay. It says - "Stow under LMP couch" - It says,  
"Open EVA umbilical bags."

09 00 18 16 CC 16, Houston. When you get around to - prior to  
suit donning, we recommend that you lubricate  
those wrist rings using the maintenance kit that's  
stored in A-8. And you might try to work some of  
that lube in around the locking rings and work  
the ring several times to try to free them up a  
little bit - the locking rings.

09 00 18 41 CDR Sir?

09 00 18 42 CMP ...

09 00 18 43 LMP Okay, Hank. We've already done that - -

09 00 18 45 CDR Okay. "Open EVA umbilical bag" - -

09 00 18 46 LMP - - we did that when we doffed the suits yesterday  
as best we could.

09 00 18 48 CDR - - "Unsnap the top strap and remove the spacecraft  
EVA umbilical all the way to the second tiedown  
strap" - -

09 00 18 54 LMP I'm not sure I had my ... whoops.

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09 00 18 56 CDR - - ... "Unsnap the second tiedown strap."

TIME SKIP

09 03 21 47 CDR Okay, Ken. What - what do we have to have on that, plus or minus 5?

09 03 21 51 CMP Seven.

09 03 21 52 CDR Seven.

09 03 21 54 CMP That's on the sight here. Wait a minute.

09 03 22 01 LMP What you need, Ken?

09 03 22 02 CMP Oh, I can't - I got this visor stuck down, and I can't see what it is.

09 03 22 06 LMP Yeah.

09 03 22 08 CMP Got it locked down.

09 03 22 09 LMP I meant to tell you about that.

09 03 22 16 CDR Need somebody to hold your foot there, Ken?

09 03 22 19 CMP Yeah, wouldn't hurt.

09 03 22 20 CDR I got ahold of it.

09 03 22 22 LMP Okay, I got the other one.

09 03 22 23 CMP Okay. I got to rotate it another few degrees. You got both my feet there?

09 03 22 32 LMP Yeah.

09 03 22 34 CMP Okay.

09 03 22 37 CDR Why didn't you go out there with a pocket? Take some goodies out with you.

09 03 22 41 CMP Okay.

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09 03 22 42 CDR You got two pockets: one on each foot.

09 03 22 44 CMP All right. Let go of my feet.

09 03 22 46 LMP Okay.

09 03 22 47 CMP I'll get up here to attitude.

09 03 22 58 CMP Where's my foot, there? ... outside, I don't think. Let's see, Charlie -

09 03 23 06 LMP What?

09 03 23 10 CMP Gonna have to - Let's see -

09 03 23 20 LMP I got you - your - your -

09 03 23 26 CMP All right, just a second. Oh, that - Guess what we didn't think about.

09 03 23 33 LMP What?

09 03 23 34 CDR What's that?

09 03 23 35 CMP Oh - that Velcro strip lays right in front.

09 03 23 45 CDR Of the sight?

09 03 23 46 CMP Yep.

09 03 23 47 CDR Well, I'll tell you what.

09 03 23 48 CMP Hang on. I got my scissors right here.

09 03 23 50 CDR Why don't you open the thing and let's forget it? It ain't all that important.

09 03 23 53 CMP I'll be right with you.

09 03 23 56 CDR Okay.

09 03 23 57 LMP You'll never - you'll never get those scissors out, Ken.

09 03 23 59 CDR Ken, I wouldn't do that.

09 03 24 00 CMP Okay, okay.

09 03 24 01 CDR It's not worth it.

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09 03 24 02 CMP Okay.

09 03 24 05 CDR Anybody ought to be able to figure that mean attitude close enough within 7 degrees.

09 03 24 09 CMP Okay. What we do need to do is to - ... up minimum impulse.

09 03 24 17 CDR Oh, for goodness sakes. Okay. How man - how far, Ken?

09 03 24 23 CMP Oh, it's got to go about 3 degrees.

09 03 24 25 CDR Okay, going to FREE.

09 03 24 44 LMP You want me to -

09 03 24 45 CDR ... do it.

09 03 24 46 LMP Let me get this old thing out of your way, John.

09 03 24 49 CMP Attitude in yet?

09 03 24 50 CDR - - ... we're going up 3 degrees.

09 03 24 54 LMP ... you catch it?

09 03 24 55 CMP Pitch down, then.

09 03 24 56 LMP ... you pitch it?

09 03 24 57 CDR Pitch down?

09 03 24 58 CMP Yeah.

09 03 25 00 CDR Pitch down. We're going down. I just put in one click down, Ken.

09 03 25 07 CMP Okay. Up should be the right direction on this thing.

09 03 25 10 LMP You said up - you said down.

09 03 25 11 CMP I said up the first time, and it - and that looked like you went the wrong way.

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09 03 25 14 CDR I didn't do anything.

09 03 25 16 CMP Oh, okay. You need to go up about 3 degrees, then.

09 03 25 21 CDR Is that the right way, now?

09 03 25 23 CMP I can't tell that you're moving.

09 03 25 26 CDR I put in three pulses.

09 03 25 27 CMP Has the attitude changed?

09 03 25 29 CDR No. Want me to fire - If I go to CMC in FREE, it should - it should fire in min impulse, right?

09 03 25 37 CMP Yeah, and that's moving now. Moving in the right direction.

09 03 25 40 CDR Okay.

09 03 25 42 CMP Let it rise. The slow rates are about another minute.

09 03 25 49 LMP Guess what I caught floating out the hatch?

09 03 25 51 CDR What?

09 03 25 52 CMP What's that?

09 03 25 53 LMP A ring.

09 03 25 54 CMP Oh, is that right?

09 03 25 56 LMP Yeah. I think it's yours.

09 03 25 57 CMP (Laughter)

09 03 25 58 CDR Yeah, it is.

09 03 25 59 LMP Here, hold it, John.

09 03 26 00 CDR That's it, all right. We got it.

09 03 26 03 LMP Just got it going over the sill.

09 03 26 05 CMP (Laughter)

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09 03 26 06 LMP In fact, it had already gone out and hit you and was coming back when I saw it.

09 03 26 10 CMP (Laughter) Boy, how's that for luck. Okay, John. We've got another - another - another 30 seconds of drift, and we'll be there.

09 03 26 23 CDR Okay. And just - Can I go back to AUTO when we get there?

09 03 26 25 CMP Yes, sir.

09 03 26 27 CDR Okay. And then stay at that attitude?

09 03 26 32 CMP Yeah.

09 03 26 33 CDR All I have to do - I have to enter on this display, right?

09 03 26 36 CMP Nope.

09 03 26 38 CDR Okay.

09 03 26 40 LMP It'd take you back, if you entered on that.

09 03 26 43 CDR Yeah. No, it'll stay - it'll hold what it's got.

09 03 26 48 LMP Won't it - won't it trim to those numbers that's in there?

09 03 26 50 CMP ...

09 03 26 59 LMP You've been out about 25 minutes now, Ken.

09 03 27 01 CMP Okay.

09 03 27 06 CDR That's funny, I've got 35.

09 03 27 08 LMP Well, maybe I - I didn't start my watch exactly right.

09 03 27 12 CDR It's more than that because I started after we started - -

09 03 27 14 CMP Okay. Why don't you go to AUTO?

**CONFIDENTIAL**

Day 10

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Page 407

09 03 27 16 CDR Going back to AUTO.

09 03 27 20 LMP Come on. Let's open that thing.

09 03 27 21 CMP Okay. Are you ready?

09 03 27 23 CDR All set to open it.

09 03 27 24 LMP Ready.

09 03 27 29 CDR You got a clock, Charlie?

09 03 27 30 LMP Yeah.

09 03 27 39 CMP Stand by.

09 03 28 00 LMP Needing some help, Ken?

09 03 28 01 CMP Yeah, can you hold my feet?

09 03 28 02 LMP Yeah, I got them. Well, that one slipped out, but I'll get this one. Can you get it open?

09 03 28 18 CMP There it is.

09 03 28 19 LMP Okay -

09 03 28 20 LMP MARK.

09 03 28 21 CMP Okay. Pull me in.

09 03 28 22 LMP Wait a minute.

09 03 28 23 CMP I'll pull myself in.

09 03 28 25 CDR Okay.

09 03 28 26 CMP Hoo.

09 03 28 29 CDR ... over there, Ken.

09 03 28 33 CC Is the MEED open now, Ken?

09 03 28 36 CMP Yes, sir.

09 03 28 37 LMP Fifteen seconds it's been open.

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09 03 28 39 CMP Been open 15 or 20 now.

09 03 28 41 CC Okay. I didn't get your mark.

09 03 28 42 CMP I'm sorry.

09 03 28 43 CDR Yeah, it's on 22 seconds now. I'm timing it.

09 03 28 47 LMP Me, too.

09 03 28 50 CDR What time you got?

09 03 28 52 LMP Twenty - 30 seconds.

09 03 28 54 CDR Okay. I - I got 3 seconds after that. Did you watch him open it?

09 03 28 57 LMP Yeah, I had it - when he hit a mark, I started my watch.

09 03 29 00 CDR Okay, well, you're 3 seconds ahead of me then.

09 03 29 03 LMP I don't think it's exactly -

09 03 29 06 CDR Well, we got to - we ought to have two watches because this event timer's not working.

09 03 29 09 LMP I know it. We lost a pencil.

09 03 29 20 CDR Only one?

09 03 29 22 LMP Saw it float out as I was climbing out.

09 03 29 26 CDR Probably mine. I think - I had one up here on the ...

09 03 29 32 LMP I don't understand that suit loop.

09 03 29 34 CDR It's the first time anything like that's ever been in outer space, isn't it?

09 03 29 37 LMP Yeah.

09 03 29 38 CMP What kind of pressures you have now?

09 03 29 39 LMP I got 4 and John's got 3.5. It looks like it's the - the - the flow divider or whatever's in there that's not doing right.

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09 03 29 48 CDR I'm in fine shape, Charlie.

09 03 29 49 CMP How about a suit gage?

09 03 29 50 LMP Huh?

09 03 29 51 CDR Could be a suit gage, yeah. I - I kind of feel like I got more than 3-1/2 in this suit, because I can't do nothing with it much (laughter). And if it - if it were 3-1/2, I'd be able to - to break it.

09 03 30 12 LMP Okay, coming up on 2 minutes, Ken.

09 03 30 14 CMP Okay.

09 03 30 17 CDR Is it hot out there now, Ken?

09 03 30 19 CMP I'm very comfortable.

09 03 30 21 CDR You got good - -

09 03 30 22 LMP MARK.

09 03 30 23 CDR - - flow, huh? What's your suit - what's your pressure, Ken?

09 03 30 27 CMP 3.85.

09 03 30 29 CDR There you go.

09 03 30 30 CMP Like a champ.

09 03 30 40 CC John, could you give us a cuff-gage reading?

09 03 30 43 CMP Okay. I got 3.85, Hank.

09 03 30 46 LMP I got 3.95. Did he ask for all of us or just for Ken?

09 03 30 53 CDR I can't transmit, Charlie.

09 03 30 55 LMP I - Well, Ken can transmit for us.

09 03 30 58 CMP Hey, Hank. Did you want all of them or just mine?

09 03 31 00 CC Roger. Could we get one from John and Charlie?

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09 03 31 01 CMP Okay. Say again what you got, John.

09 03 31 04 CDR I got 3.55.

09 03 31 06 CMP John has 3.55.

09 03 31 08 LMP And I got 3.95.

09 03 31 10 CMP Charlie has 3.95.

09 03 31 11 CC 3.55. Roger. 3.95.

09 03 31 19 LMP That must be sublimating from somewhere.

09 03 31 21 CDR It's coming off - it's coming off the - conden -  
the condensation is coming off the glycol lines.

09 03 31 26 LMP Oh.

09 03 31 28 CMP Probably getting some off the bulkheads, too - -

09 03 31 29 CDR Yeah, that's right - -

09 03 31 30 CMP - - it's drying up the ...

09 03 31 32 CDR I mean to tell you, there's a lot of cottonpicking  
water in this machine. Didn't you notice all them  
bubbles leaving? That was all water.

09 03 31 38 LMP Yeah.

09 03 31 40 CMP Okay, how's the time coming?

09 03 31 41 LMP/CDR ...

09 03 31 42 LMP You passed 3 minutes.

09 03 31 44 CDR Seems like an eternity.

09 03 31 45 CMP It sure does.

09 03 31 47 CDR It's gonna be the longest 10 minutes in history.

09 03 31 52 LMP MARK; 03:30.

09 03 31 55 CDR Houston, you are now wit - witnessing one of the  
longest 10-minute periods in history.

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09 03 32 02 LMP That - that's the wro - -

09 03 32 04 CC Roger.

09 03 32 05 LMP Yeah.

09 03 32 08 CDR That is the wrong thing to say (laughter).

09 03 32 10 LMP Huh? (Laughter) I don't know, that 2-1/2 minutes - the 2 minutes and 42 seconds was pretty long, too. (Laughter)

09 03 32 18 CMP (Laughter) Yeah, I think that one was longest.

09 03 32 23 LMP Yeah.

09 03 32 27 CMP I was looking at our dump nozzles out here and there's very little buildup on the - on the waste dump.

09 03 32 34 CDR Listen, if anything happens during this period, the only thing we can say is that we died so that the germs may live, and that ain't no good at all.

09 03 32 42 CMP (Laughter) I don't plan to have that.

09 03 32 45 CDR That's right.

09 03 32 48 LMP Okay, we've passed 4, coming up on 04:30.

09 03 32 50 CMP Okay.

09 03 32 51 LMP MARK.

09 03 32 55 CMP Henry, was there anything else you wanted to know about the SIM?

09 03 33 04 CC Roger. When you were arou - around the mapping camera, did you happen to notice the condition of the cable that lays between it and the bulkhead there?

09 03 33 11 CMP No, I couldn't see down in there, there was too many shadows.

09 03 33 17 CC Roger; copy.

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09 03 33 18 CMP The camera looks - -

09 03 33 19 CC And on the stellar camera door, how far out was it?

09 03 33 22 CMP Oh, I'd say the - the last folding lip is up against the handrail. Well - Yeah, just about that far.

09 03 33 34 LMP We've passed 5 minutes, Ken.

09 03 33 36 CMP All right, thank you.

09 03 33 39 LMP Are you comfortable, Ken? You want me to hold on to something?

09 03 33 41 CMP No, I'm just fine. I got nothing to do but just loop my finger around this thing.

09 03 33 44 LMP Okay. Can you see the sunlight?

09 03 33 46 CDR On this - on this event timer, Charlie, I got 04:16. Is that right?

09 03 33 50 LMP That thing ain't working. No. Can you see the sunlight, Ken?

09 03 33 57 CMP No, sir.

09 03 33 58 CDR Okay, now. We need a mark for Charlie at 09:30 and one - I mean for 09:30, we need to mark and for 09:50, we need to mark.

09 03 34 06 CMP Right.

09 03 34 08 LMP Okay. Look at that piece of ice, John.

09 03 34 11 CDR Yeah.

09 03 34 23 LMP How you doing, Ken?

09 03 34 24 CMP Fine.

09 03 34 25 LMP Okay.

09 03 34 28 CDR First time anybody ever laid it on the line for a microbe.

09 03 34 31 CMP (Laughter)

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09 03 34 32 LMP I'll say.

09 03 34 35 CMP (Laughter) I wish you wouldn't put it that way.

09 03 34 37 LMP Can you see the surge tank?

09 03 34 39 CMP No.

09 03 34 40 LMP John, can you see the - pressure?

09 03 34 43 CDR Yeah, it's - You won't believe what it is.

09 03 34 47 LMP 860?

09 03 34 48 CDR No, it's 720. Just about what it could get. It just stays there. It's really in good shape.

09 03 35 05 LMP Oh, no, I must be nervous. I've taken two leaks already. (Laughter)

09 03 35 08 CMP (Laughter)

09 03 35 14 CDR Okay. Now I got 5 minutes on this thing.

09 03 35 16 LMP No, it's coming up 7.

09 03 35 18 CDR Okay.

09 03 35 20 CMP (Laughter) No wonder that was such a long - Hank, we got another one of those event timers that times at some pace other than universal time. But don't worry about the MEED; we've got a watch on it.

09 03 35 39 CC Okay; I'm timing you down here, too.

09 03 35 40 CMP Okay; we got regular - regular watches on it, so it's okay.

09 03 35 44 LMP Tell him to give us a mark at 8 minutes.

09 03 35 47 CMP Yeah, why don't you check us at 8 minutes, Hank?

09 03 35 52 CC Will do.

09 03 35 56 LMP How, Moon rock.

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09 03 36 07 LMP I think this may be tuff - tuff breccias, John.

09 03 36 15 CDR Call them like you see them, Charlie. You said that once or twice.

09 03 36 20 CC Coming up on 8 minutes -

09 03 36 22 CC MARK.

09 03 36 24 LMP Within a second.

09 03 36 25 CMP Okay; thank you, Hank. We're right with you.

09 03 36 30 LMP And with the time delay, I'm probably right on. Ten minutes to look at the bugs. You got to be crazy! (Laughter)

09 03 36 47 CMP Did you get a good look at the Earth, Charlie?

09 03 36 49 LMP Oh, yeah. And I spun around and looked at the Moon, too. The thing that impresses me, though, is how black it is, Ken. Yeah, is it black!

09 03 37 04 CMP I'm really surprised I don't see any stars.

09 03 37 07 CDR Charlie's only said 25 times it's black out there.

09 03 37 11 LMP What?

09 03 37 12 CDR You've only said that 25 times. (Laughter)

09 03 37 14 LMP ... see ... (laughter).

09 03 37 15 CDR It really must be black out there! (Laughter)

09 03 37 17 LMP It's really black! (Laughter)

09 03 37 21 CMP (Laughter) Okay; what time is it?

09 03 37 22 LMP MARK; 9 minutes.

09 03 37 23 CMP Okay; 9 minutes.

09 03 37 28 CDR Okay; after 10 minutes, give mark, close experiment, and turn lock 90 degrees CCW.

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09 03 37 32 LMP Okay; he needs a mark at 09:30 and - -

09 03 37 35 CDR 09:30 ... 10 - ... in 10 minutes.

09 03 37 37 LMP Okay. Okay; coming up - it's 09:25 now. Stand by. Okay, Ken.

09 03 37 52 LMP MARK; 09:30.

09 03 37 53 CC Got about 30 seconds, Ken.

09 03 37 54 CMP Okay; I'm on my way to the experiment. Charlie, can you hold my feet there?

09 03 37 58 LMP Yeah, I got you.

09 03 37 59 CMP And would somebody give me a call at 10?

09 03 38 01 LMP I will.

09 03 38 02 CDR Okay; give a call at 09:50, too.

09 03 38 04 LMP I will. 09:45 now.

09 03 38 09 CMP Man, that sight's right on.

09 03 38 12 LMP MARK; 09:50.

09 03 38 13 CMP Okay. We're counting down the last 10.

09 03 38 19 LMP Three, 2, 1. There's 10 minutes.

09 03 38 21 CMP Closed.

09 03 38 24 LMP Okay.

09 03 38 26 CC And make sure it's closed and locked, Ken.

09 03 38 27 CMP It's closed - -

09 03 38 28 CDR Turn lock 90 degrees - -

09 03 38 29 CMP I'm working on the lock.

09 03 38 30 CDR Turn lock 90 degrees CCW.

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09 03 38 35 LMP What if those bugs get out of - get out into here with a - -

09 03 38 39 CDR They'll die.

09 03 38 41 CMP Charlie, can you hold my feet real good there?

09 03 38 43 LMP Yeah, I got you.

09 03 38 44 CMP How about both of them?

09 03 38 46 LMP No, I can't reach - -

09 03 38 47 CMP Okay.

09 03 38 48 LMP - - the other one, it's above my head, Ken.

09 03 38 56 CDR How are those TV cables down there, Charlie?

09 03 38 58 LMP They're okay.

09 03 38 59 CDR Are they well out of the way?

09 03 39 00 LMP Yeah - they're - No, they're not well out of the way, but they're out of the way.

09 03 39 03 CDR Okay. Now what you got hung up on last time over there was that pan camera - -

09 03 39 08 LMP Okay.

09 03 39 09 CDR - - hanging thing, and it's well out of the way.

09 03 39 13 LMP How you doing, Ken?

09 03 39 16 CMP Well, I didn't get it locked.

09 03 39 20 CDR Ninety degrees CCW.

09 03 39 22 CMP Yeah, I'm - I'm working on that, John. I got to compress the seal. I'm trying to get some leverage on it.

09 03 39 28 CDR Oh, man.

~~CONFIDENTIAL~~

Day 10

~~CONFIDENTIAL~~

Page 417

09 03 39 36 LMP Looks like it's the other cor - the corner next to your lock - the lock, Ken, that's not quite closing. You want to bring it in and let me help you?

09 03 39 49 CMP Wait a minute.

09 03 39 51 CDR Probably got some bubonic plague in that son of a gun.

09 03 39 55 LMP Man, I'll bet you that UV got them. Now, that looks pretty good, Ken.

09 03 40 10 CMP Well -

09 03 40 13 LMP Looks like it's locked to me.

09 03 40 15 CMP No.

09 03 40 17 CDR ... Closing.

TIME SKIP

09 05 41 53 CDR Yeah.

09 05 41 55 LMP ...

09 05 42 01 CDR ... AUTO.

09 05 42 08 LMP ... there's one.

09 05 42 26 LMP John, what does it say do with the MEED?

09 05 42 32 CDR It doesn't say. It says, "Remove center couch and temporary stow under commander couch. Stow couch straps in R-5." "MEED and cover, A-7 - with cover, A-7, installed." No, no, it doesn't say what to do with it yet. Why don't you just don't worry about it. Huh?

09 05 42 58 LMP No, it says "Stow in A-7," John.

09 05 43 01 CDR No, it doesn't.

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09 05 43 05 LMP Stow in A-7, all of these things. And the MEED - -

09 05 43 08 CDR With cover installed, yeah, that goes in A-7.

09 05 43 14 CDR/LMP The OPS - -

09 05 43 15 CDR - - "EVA equipment container, fold up place next to OPS; penetrometer drum; secure the strap; entry boots and ropes with other straps; restow headrest pads, loose; vacuum cleaner bag."

09 05 43 28 CMP ...

09 05 43 31 CDR Well, let's not do that yet. There's a whole bunch of other things that they want you to do here first. You want to do it in order?

09 05 43 36 CMP ...

09 05 43 37 CDR No. It says "Remove center couch and temporary stow under the CDR couch." Now that ain't even in order.

09 05 43 42 CMP ... couch ...

09 05 43 45 CDR What it says here.

09 05 43 46 CMP ...

09 05 43 48 CDR Oh.

09 05 43 49 CC 16, let's go OMNI Delta; we reacquired a high gain when we went into a new attitude.

09 05 43 54 CDR Say again.

09 05 43 55 LMP Okay.

09 05 45 56 LMP That's a pretty good program they've got that can figure out how to point all these experiments at the right places in the sky.

09 05 46 36 LMP Ah, that's old R-12 floating by. Humm. Hey, when are we supposed to cap the relief valves on our suits? John - -

**CONFIDENTIAL**

09 05 46 49 CDR What?

09 05 46 52 LMP When are we supposed to cap the relief valves on our suits?

09 05 46 58 CMP ...

09 05 47 04 LMP Well, I had done that when I got my suit out, because I thought it was in the procedure, and I said, well, I'll get a step ahead. But I don't ever - -

09 05 47 13 CMP ...

09 05 47 16 LMP Doesn't matter. How many rads did I get? Not a one.

09 05 47 28 CMP Okay, I'm coming down. ....

09 05 47 36 CDR It says, "Stow couch straps in R-5." It says, "Stow OPS hose, actuator, and flaps. Verify O<sub>2</sub> is off." "Stow OPS hose, actuator, and flaps. Verify the O<sub>2</sub> is off." It says, "Report the OPS pressure to Houston."

09 05 47 55 LMP How's the maneuver?

09 05 47 58 CDR Doing good. We're almost there. How much - how much is OPS pressure, Ken?

09 05 48 11 CMP ...

09 05 48 18 LMP Really?

09 05 48 19 CDR Houston, we still got 1300 psi on the OPS. That's being reported as per page - -

09 05 48 29 CC Roger; we copy.

09 05 48 30 CDR - - page X/3-22, in the middle of the page.

09 05 48 36 CC Roger; copy.

09 05 48 54 CDR Then it says, "Remove from A-7 to stow in U-2, two HEL bags," whatever a HEL bag is. Doesn't say "Helmet bag." It says "HEL bag"; H-E-L b-a-g.

**CONFIDENTIAL**

09 05 49 25 CDR I lost my pencil. Charlie, you took it - -

09 05 49 29 LMP I have it. I got it.

09 05 49 33 CDR Got to have it back.

09 05 49 34 LMP Here you go.

09 05 49 35 CDR Thank you.

09 05 50 27 CDR Huh? It says, "Stow OPS hose, actuator, and flaps. Verify O<sub>2</sub> off." "Report OPS to Houston." We did. "Remove from A-7 to stow in U-2: two helmet bags and one accessory bag, and the cabin fan filter"; that's "if required, if required." Then it says, "Remove A-9 rock bag and temporary stow."

09 05 51 03 CDR Where's the A-9 container?

09 05 51 08 LMP We do this alphabet again?

09 05 51 13 CDR Yeah. Charlie. Okay, it's, "Stow in A-7: OPS, flag up, feet inboard." Charlie, I'm going off comm.

09 05 51 29 LMP Okay.

09 05 52 00 CDR Okay, EVA equipment container, fold up, place next to OPS.

09 05 52 51 CDR ... Where's that?

09 05 53 41 CDR Okay, ... "Secure the strap." ... "Secure the strap."

09 05 54 05 CDR "Stow entry boots and ropes" ...

09 05 54 36 LMP You want me to ...

09 05 54 38 CDR Yeah.

09 05 55 38 LMP Houston, 16, on the high gain.

09 05 55 44 CC Roger. Loud and clear, Charlie.

TIME SKIP

**CONFIDENTIAL**

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09 06 35 23 LMP And it doesn't look like it took, Pete.

09 06 35 29 CC ... again?

09 06 35 50 CDR ...

09 06 36 02 LMP Okay, Pete. I went to MANUAL and tweaked up the PITCH a little bit.

09 06 36 06 CDR ... hand controller ...

09 06 36 07 LMP And then went to NARROW and REACQ, and it looks like we got it now.

09 06 36 14 SC ..., Charlie.

09 06 36 15 SC Yeah.

09 06 36 18 CC ... to us ... now, Charlie.

09 06 36 20 SC ...

09 06 36 38 LMP Well, I am. I'm gonna get out of the suit. How's that, huh? Hello, tape recorder. It's running. You know, I forgot to ask INCO how that old pro [?] temp was. Never once did I ask him.

## TIME SKIP

09 08 00 31 LMP Knew we'd find it.

09 08 01 46 LMP ... cover.

09 08 01 51 CDR Close the X-ray alpha cover.

09 08 01 53 LMP Okay.

09 08 01 54 CDR Is - is the - Wait a second, Charlie. Is that thing retracted?

09 08 02 01 LMP ...

09 08 02 04 CDR Okay. ... One of these days I've got to learn what's in this package.

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09 08 02 31 LMP You want to take that for me?

09 08 03 02 LMP Pretty hard to make the old ...

09 08 03 17 LMP When does that happen? ...

09 08 03 55 CDR This thing is leaking like a sieve.

09 08 03 58 CMP ...

09 08 04 01 LMP ...

09 08 04 04 CDR This place is gonna - it smells like an outhouse now. I don't - -

09 08 04 09 SC ...

09 08 04 24 LMP ... back?

09 08 04 47 LMP ... got ...

09 08 04 54 CDR ... rubber to the valve in there.

09 08 05 08 CDR That makes me mad.

09 08 05 49 LMP ...

09 08 05 54 CDR Ken is watching it. ... just give me the word they want to watch the middle gimbal angle.

09 08 06 02 CMP ... around it. ...

09 08 06 11 CDR In fact, he was just flying around it.

09 08 06 58 SC ...

09 08 07 04 CDR Ah, my salvation! I found you, you son of a gun. It's an extra thing.

09 08 08 24 LMP ... Charlie.

09 08 08 26 CMP ... Charlie.

09 08 08 29 CDR Charlie.

09 08 08 30 LMP ... hear ...

~~CONFIDENTIAL~~

09 08 08 31 CDR OMNI Charlie.  
09 08 08 32 SC ...  
09 08 08 33 CDR OMNI Charlie.  
09 08 08 34 SC ...  
09 08 09 21 CDR I found it.  
09 08 09 23 CMP ...  
09 08 09 24 CDR No, one of these things.  
09 08 09 31 LMP ... now.  
09 08 09 34 CDR Charlie, you've had it. (Laughter) I don't know ... I saw it go floating by here a minute ago. That's about the truth. You put it in the seat there, I thought. Notice it didn't stay there (laughter).  
  
09 08 09 51 SC ...  
09 08 09 57 CDR ... I'll find it for you, Charlie.  
09 08 09 59 LMP Okay.  
09 08 10 00 CDR Just hang in there ... Don't need it right this minute, do you?  
09 08 10 03 LMP No, ...  
09 08 10 14 LMP Ken, that's the ... on that EVA.  
09 08 10 18 CMP Oh, shoot.  
09 08 10 19 CDR Oh, shoot?  
09 08 10 20 LMP Fantastic. No way ... everything ... run perfect.  
09 08 10 25 CDR A lot of hours there.  
09 08 10 29 LMP ...  
09 08 10 50 CDR Why was it embarrassing?

~~CONFIDENTIAL~~

**CONFIDENTIAL**

09 08 11 07 CMP ...

09 08 11 28 CDR Man, that place was dazzling.

09 08 11 34 SC ...

09 08 11 36 CDR No. I'm trying to finish off the one I started about 10 minutes ago. If I don't finish it, old Henry is going to get all mad at me and quit.

09 08 11 46 SC ...

09 08 11 49 CDR She's running on choked flow right now, supposed to be.

09 08 11 52 SC ...

09 08 11 54 CDR Here's one of our basalts, Charlie.

09 08 11 56 LMP Oh, I been looking ... I put it in here. ...

09 08 12 07 CDR What's that?

09 08 12 15 LMP No, there it is; it's back in there.

09 08 12 21 CDR Thank goodness! Oh, that feels so good. Oh, oh. Oh, man.

09 08 12 57 LMP ...

09 08 13 06 CMP I got some ... here.

09 08 13 17 CDR Yeah, that's what I want to do is wash up and get some dirt off my hands.

09 08 13 22 SC ...

09 08 13 24 CDR You can have a couple, Ken.

09 08 13 27 LMP We got - we got some hand ...

09 08 13 29 CDR Really?

09 08 13 31 SC ...

**CONFIDENTIAL**

09 08 13 36 CDR These guys from the South, they just don't wash regular (laughter). So used to digging in dirt, they just don't - don't even bother.

09 08 13 51 LMP That ...

09 08 14 20 CMP Is that ... my ...?

09 08 14 21 LMP Yeah.

09 08 14 31 CMP ...

09 08 15 41 CDR Where is it? Where's the stowage bag? I don't see that. Oh, there it is.

09 08 15 53 CDR Yeah, I'll get some.

09 08 16 09 SC ...

09 08 16 17 CDR First night? First 5 minutes. I told those doctors when we hit that deck, I want a shower. I've been there before, and I ain't putting up with anything else. I ain't gonna do nothing.

09 08 16 28 CMP ... (laughter) ... back off.

09 08 16 49 LMP ... you guy ... over there?

09 08 16 51 CMP ...

09 08 16 57 LMP ...

09 08 17 15 SC ... (Laughter)

09 08 17 22 CDR That's telling the whole world, yeah.

09 08 17 24 LMP ...

09 08 17 33 CDR I get the feeling that potassium - You want some?

09 08 17 36 SC ...

09 08 17 37 CDR I got the feeling that potassium in there has a lot to do with that. I really do.

09 08 17 41 SC ...

**CONFIDENTIAL**

Day 10

09 08 17 48 LMP Well, that was the reason ...

09 08 17 56 CC ...

09 08 18 11 CDR Roger; understand. HIGH GAIN, minus 10 and 260 on HIGH GAIN. And follow that up by the GAMMA RAY - GAMMA RAY DOOR - ALPHA/X-RAY DOOR to OPEN, and the GAMMA RAY SHIELD, on?

09 08 18 29 CC ...

09 08 18 33 CDR Plus 10 on the HIGH GAIN.

09 08 18 37 SC ...

09 08 18 38 CDR Supposed to go OFF.

09 08 18 40 LMP ... OFF.

09 08 18 45 CDR Okay, the DOOR's OPEN, and the SHIELD's OFF.

09 08 19 28 CDR I don't know if I had any records in there or not. I'm going to get me some music.

09 08 20 25 CDR What are you doing? ...

09 08 20 29 LMP Testing the light.

09 08 20 41 LMP ...

09 08 20 50 CDR Oh, boy!

09 08 20 52 SC (Music)

09 08 21 01 CDR Yeah. ...

09 08 21 11 SC ...

09 08 21 14 CDR I don't care who it is; it sounds great.

09 08 21 16 SC ...

09 08 21 32 CDR Yeah. Yeah. I played football with Diercino [?] in high school. Yeah, he'd make - he was a big 190-pound kid when I played. ... he went to Florida and got to be all Southeastern Conference or something. Just goes to show you. Me, I used

**CONFIDENTIAL**

~~CONFIDENTIAL~~

to knock him around, and when I can knock somebody around, you - you ain't any good. You're really bad. I sure would hate to knock - to knock him around after he got to Florida (laughter).

09 08 22 12 SC ...

09 08 22 16 CDR Okay; plus 260 - 280 and plus 10.

09 08 22 22 LMP Is that HIGH GAIN?

09 08 22 24 CDR HIGH GAIN, yeah. Plus 10, he said. Got it, Charlie?

09 08 22 35 LMP ...

09 08 22 52 CDR ... Put the UV thing in there, Charlie.

## TIME SKIP

09 11 20 10 LMP Where do we stow the high gain ...?

09 11 20 28 LMP Okay, Pete. We're putting TELCOM GROUP 2 to AC2.

09 11 20 31 CDR ...

09 11 21 36 LMP Okay, I put GR - GROUP 2 to AC2. They said for some reason they lost the high gain - they lose the high gain.

09 11 21 43 CDR ...

09 11 21 44 LMP Me, too. That's the way they want it.

09 11 21 53 CDR ...

09 11 21 56 LMP No, we're - they're controlling the antenna.

09 11 22 00 CMP They have - they can only control between Delta and what we have control of.

09 11 22 05 LMP Well, I switched it to HIGH GAIN.

09 11 22 07 CMP Do you think the high gain will ...?

09 11 22 46 LMP I'm turning the VOICE, OFF.

~~CONFIDENTIAL~~

**CONFIDENTIAL**

09 11 22 48 CMP ...?

09 11 23 00 CMP ..., Charlie?

09 11 23 01 LMP No. I done that last one.

09 11 23 15 LMP Houston, 16.

09 11 23 19 CC ...

09 11 23 20 LMP Pete, are y'all satisfied with our antenna setup?

09 11 23 37 CC ... TRACK mode to REACQ and NARROW BEAM.

09 11 23 43 LMP Okay. You've got REACQ, NARROW BEAM, and HIGH GAIN selected.

09 11 23 53 CC Okay. That's fine, Charlie. Thank you.

09 11 24 08 LMP Okay.

09 11 24 31 LMP (Laughter) I haven't ..., John, ...

09 11 24 36 CDR ...

09 11 24 44 LMP I get hot under there ...

09 11 24 47 CMP ...

09 11 26 14 LMP ... ditty bag.

09 11 26 16 CMP Well, it's pretty ...

09 11 26 17 LMP Yeah.

09 11 26 22 CDR What we want to do is ...

09 11 26 42 LMP Well, the way I sent them over is the way - is the way they were to be stowed because - they were - and that's the way we stowed them over there.

09 11 26 49 CMP ... That was the way we had stowed them ...

09 11 27 22 LMP Yeah, but the decon bags that came ... in, too ...

TIME SKIP

**CONFIDENTIAL**

09 19 40 55 CDR Changes on initiation before we stop, huh? Okay.

## TIME SKIP

09 19 55 49 LMP You mean the experiment?

09 19 55 51 CDR No.

09 19 55 52 CMP ...

09 19 55 55 LMP What do you want - the shield?

09 19 55 57 CMP That ...

09 19 55 58 LMP No.

09 19 55 59 CDR That was the GAINSTEP.

09 19 56 00 LMP Well, it's ..., but it's shield on the bottom.

09 19 56 04 CDR Oh. Oh. Excuse me.

09 19 56 05 LMP Okay.

09 19 56 06 CDR No wonder I couldn't find it. I'd be over there looking for a month.

09 19 56 30 CDR ...

09 19 56 31 CMP Okay. Oh, that's why it didn't - that helps. I turned it off so I wouldn't keep you awake.

09 19 56 37 CDR You thought - you thought my ears were going bad, huh? All right, we'll cycle our cryo fans. I'll start the watch.

09 19 56 47 CMP Good. I got the watch.

09 19 56 50 CDR Speaking of starting watches, there's my watch. Come back here, you rat.

09 19 57 35 CMP Excuse me, Charlie.

**CONFIDENTIAL**

09 19 58 47 CDR Okay, where's that Super Gal located? Is that where it's at, huh?

09 19 58 52 CMP 267.

09 19 58 54 CDR I wasn't very far off.

09 19 58 57 CMP I can't believe that they can tell any difference. That's roll - yaw.

09 19 59 03 CDR We didn't scratch anywheres close, did we?

09 19 59 06 CMP Why we went to 189 when we could have gone to exactly the opposite up here, I don't know. ...

09 19 59 24 CDR That doesn't make a lot of sense, does it?

09 19 59 28 CMP No.

09 19 59 37 CMP ... in, but that doesn't ...

09 19 59 55 CMP Well, what's going on here?

09 20 00 10 CDR It's not moving?

09 20 00 25 LMP ... here.

09 20 00 31 CMP I don't - Well, we're supposed to swap, yeah.

09 20 00 39 LMP Am I supposed to be on it all this time?

09 20 00 42 CDR Huh?

09 20 00 43 LMP Am I supposed to be on?

09 20 00 44 CDR No.

09 20 00 47 CMP What am I doing wrong, John?

09 20 00 50 CDR I'm sure I don't know.

09 20 00 54 CMP How come my DAP isn't running?

09 20 01 00 CDR 11101. Okay?

09 20 01 25 CMP Why don't those needles center? I think you didn't get any power to that switch.

**CONFIDENTIAL**

09 20 01 39 CDR Check the group 2s.

TIME SKIP

09 20 19 30 CDR ... meals.

09 20 19 31 CMP Yeah. Okay; now - you got 6-1/2, Charlie, and no - and no medication?

09 20 19 41 LMP No. That's right.

09 20 19 42 CMP Yes - -

TIME SKIP

09 20 32 57 CDR Why would you - -

09 20 33 01 CMP Well, they were turning the power off there for a while because of a possibility that you - they thought that - you were sleeping, you might bang it.

09 20 33 12 CDR Kick it off, huh?

09 20 33 13 CMP Yeah. And I guess I can't say you couldn't do that, because I - I caught myself when I was - the times I was knocking switches was when I was moving around trying to do things.

09 20 33 28 CDR I tell you, I fell asleep with my hand on the integral lighting the other day, and I - and it - and I woke up still holding on to it. Funniest thing I ever did in my life. Boy, that tape recorder switch's just going like crazy.

09 20 34 07 LMP Okay. I ... to the last. If I eat all this, I'm going to explode.

09 20 34 11 CMP What, Charlie?

09 20 34 12 LMP If I eat all this, I'm gonna explode.

09 20 34 16 CMP ... peaches ...



**CONFIDENTIAL**

09 20 34 17 LMP I like those peaches, Ken.

09 20 34 44 CC Apollo 16, Houston. If one of you have a chance, would you read out the battery compartment pressure ...?

09 20 34 48 CDR 2 - -

09 20 34 49 LMP 2.5

09 20 34 51 CDR - - 2.5 and holding.

09 20 34 56 CC Okay.

09 20 34 59 LMP That's what it was - When it was get - -

09 20 35 00 CMP ...

09 20 35 02 CDR Okay; Ken says he looked at it several times during the evening, and it's been there most of the night.

09 20 35 10 CC Okay; fine.

09 20 35 32 LMP Hey, John, could you spin around here? ... behind you.

09 20 35 34 CDR Yeah, Charlie. Just a second.

09 20 35 36 LMP Sure.

09 20 35 41 CDR Sir? Okay. Here's the Flight Plan. We're doing what we're supposed to be doing for a change.

09 20 35 55 CDR Here you go, Charlie.

09 20 35 59 LMP Thank you.

09 20 36 08 LMP ... Oh, no. Here's another - another whole package. Excuse me.

09 20 36 14 CDR What have you got I can substitute for the cracking - for the grits?

09 20 36 23 LMP ...

**CONFIDENTIAL**

09 20 36 26 CDR Not for the grits, no. I don't want to hurt your feelings, Charlie. I mean for my coffee.

09 20 36 34 LMP I'll get you some out of the food locker over here.

09 20 36 39 CDR Yeah, maybe a dark drink. Not bad. You mix this with coffee and you know what you got? It's bad.

09 20 36 51 CMP ...

09 20 36 54 CDR (Laughter) I'm going to try that and see what they say. (Laughter)

09 20 36 59 LMP What is that?

09 20 37 01 CDR I'm going to mix this with coffee and put it in - down in there and see if they can tell what it - -

09 20 37 08 CMP ... Why don't you do that?

09 20 37 10 LMP Surprise.

09 20 37 23 CDR Oh, oh. ... that gonna be funny. (Laughter)

09 20 37 42 CDR Charlie, these grits are all right.

09 20 37 44 LMP They are ...

09 20 37 45 CDR Mm-hmm. Just what I'd always eat when I was starving down South.

09 20 37 56 LMP Kept people alive.

09 20 37 58 CDR Sure did.

09 20 38 12 CDR Kept lots of people alive. You know the old saying.

09 20 38 21 LMP I think these are better than the Skylab peaches.

09 20 38 25 CDR What we used to say - what my roommate used to say - He was from New Jersey - he said you had to be near dead to eat grits. I'll never forget the time that he - we were going through - eating at the mess hall at Georgia Tech, and he thought he was getting some Cream of Wheat - -

09 20 38 47 LMP Yeah.

**CONFIDENTIAL**

09 20 38 48 CDR - - and they put it on his plate, and he couldn't understand why they didn't put it in a bowl. Man, he spit grits.

09 20 38 51 LMP ... had them.

09 20 38 58 CDR He spit grits for 20 feet when he put them in his mouth - He thought they were trying to kill him.

09 20 39 09 LMP ... down, John. ...

09 20 39 13 CDR Yeah.

09 20 39 14 LMP ...

09 20 39 15 CDR Sorry.

09 20 39 38 SC (Cough).

09 20 39 55 CDR Well, another thing I ought to do a lot of exercise today. Get the old cardiovascular system back in shape.

09 20 40 19 CDR First thing we ought to do is go to work on the Entry Checklist, right? Entry Stowage List?

09 20 40 30 LMP What for? We haven't figured it out.

09 20 40 35 CDR We could get the TV.

09 20 40 40 CMP That's way back over here. Right on the very bottom of everything.

09 20 40 54 LMP We should have thought of that.

09 20 40 56 CDR Huh?

09 20 40 58 LMP We should have thought of that.

09 20 41 00 CMP ... changing ...

09 20 41 03 LMP Yeah.

09 20 41 13 LMP I never could - -

TIME SKIP

**CONFIDENTIAL**

Day 10

Page 435

~~CONFIDENTIAL~~

09 20 52 50 CDR What's that?

09 20 52 52 CMP We're getting better. Started late and got through early.

09 20 52 55 CDR That was real organized this morning, Ken.

09 20 52 57 LMP It worked great. You just cutting that meat.

09 20 53 01 CMP Yeah. That seemed to work out pretty good. ... pretty good?

09 20 53 07 CDR We should have done that all along - I guess.

09 20 53 08 CMP Yeah. We should have ...

09 20 53 11 CDR Don't know it, until you do it.

09 20 53 12 LMP ... - -

09 20 53 13 CDR We ought to recommend that to the 17 guys.

09 20 53 15 CMP The trouble is, you know, you try to talk to the guys before the flight about this and - -

09 20 53 17 CDR ... about a year before the flight.

09 20 53 20 CMP - - things like how you defecate, how ... you have to be. They ain't gonna listen.

09 20 53 26 CDR Why, no.

09 20 53 28 LMP ...?

09 20 53 29 CMP What else ... .. probably won't pay any attention. ...

09 20 53 36 LMP The only - I did listen to Stu Roosa on that thing ... He said get naked and be prepared to get stuff all over your hands. And it happened.

09 20 53 46 SC (Laughter)

09 20 53 50 CDR Just like he said, huh? There's no consolation in that.

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**CONFIDENTIAL**

09 20 54 04 CDR Careful.

09 20 54 06 LMP John, what can we do on the stowage or something that - maybe just to occupy my mind - -

09 20 54 08 CMP Well, you know they got a geology debrief for you guys at 262 hours.

09 20 54 15 CDR When is the press conference?

09 20 54 18 CMP At 268.

09 20 54 19 CDR ...

09 20 54 21 CMP And I really want to - I want to take some photographs of the - of the ...

09 20 54 31 CDR Okay.

09 20 54 33 CMP And I would like to take photos ... while you guys eat - interior photos. ...?

09 20 54 41 CDR Okay.

09 20 54 44 CMP I really think - I need ... - the only thing that you could really have ... is plastic ...

09 20 54 50 CDR You can't get that. I ... them my lightweight headset. I got to try that thing. Is there a way to get that? It's down there in the A-8, isn't it?

09 20 54 56 CMP It's a pain.

09 20 54 58 LMP I'm going to take mine off - -

09 20 54 59 CMP - - ... supposed to be. They're absolutely worthless.

09 20 55 02 CDR You want to wear these things for the press conference?

09 20 55 04 CMP Think that's only way they can hear you.

09 20 55 07 CDR Okay.

09 20 55 10 CMP That's wh - one reason I've been wearing mine all the time is it's the only way I can get Houston.

**CONFIDENTIAL**

~~CONFIDENTIAL~~

The DSE won't pick up the lightweight set hardly at all, unless you do what Charlie is doing, otherwise you won't be ...

09 20 55 21 CDR Probably be better if you - -

09 20 55 23 LMP Take off your neck.

09 20 55 26 CMP ... you in.

09 20 55 29 LMP ...?

09 20 55 30 CMP Yeah.

09 20 55 38 CDR Thank you.

09 20 55 45 LMP ...

09 20 55 46 CMP Open?

09 20 55 48 CDR How many did we have? ...

09 20 55 58 CDR Wonder why they wouldn't be happy just to have a press conference on the radio?

09 20 56 01 CMP Too ... of the ...

09 20 56 06 LMP Oh, is that right?

09 20 56 07 CDR I don't know - I don't know how we're going to set this thing up.

09 20 56 09 LMP You can set it right back here on this bracket, John.

09 20 56 12 CDR Oh, yeah.

09 20 56 13 LMP And point it right - it'll - and point it to the LEB, and we can all three get in the picture.

09 20 56 17 CMP I'll get in the ... while you guys can get in the picture, okay?

09 20 56 21 LMP That's at 262 - 262 you say we got a geology debriefing?

~~CONFIDENTIAL~~

**CONFIDENTIAL**

09 20 56 28 CDR Where does this here go, I wonder? I wonder if they think that this thing is supposed to stay in here with a - -

09 20 56 36 CMP Yeah.

09 20 56 37 CDR - - pressure suit.

09 20 56 41 LMP That'll go.

09 20 56 46 CMP Oh, I'm sure it will. I just - ... like ... have had it in there because actually it won't go ... - -

09 20 56 54 CDR Yeah.

09 20 57 00 CMP ... a box of ...?

09 20 57 05 LMP Oh, man! Going to be ...

09 20 57 09 CDR Hey, let me - let me - Okay, Charlie - -

09 20 57 12 LMP That's your friend.

09 20 57 14 CDR Charlie, don't stomp it like that. Let me see if I can get this in there. Okay?

09 20 57 19 LMP I think you can now. ... I got some ... going in there. Well, I'll just let them float by you.

09 20 58 28 LMP I know what I'm gonna do - brush up my teeth.

09 20 58 39 SC ... (laughter).

09 20 58 43 CMP No, I don't have the urge yet, you guys. It'll be a couple of more hours. Right in the middle of the press conference.

09 20 58 49 CDR Right.

09 20 58 51 LMP Well, we got to sign off now.

TIME SKIP

09 21 12 54 CC We're just trying to give you some time to hunt for the peanut butter.

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09 21 14 11 CMP ...

09 21 14 12 LMP No, I don't. They want John on biomed. Me tonight.

09 21 14 26 CDR You know, when I put my biomed on, my heart starts hurting ...

09 21 14 36 LMP Why don't we stick the pills down the Volkswagen pouch, Ken?

09 21 14 42 CDR I'm going to get in my seat to put this biomed on so it won't interfere with anybody.

09 21 14 50 CMP Okay.

09 21 14 51 LMP Hey, John.

09 21 14 52 CDR If it won't interfere with anybody, I will.

09 21 14 54 LMP Hey, John. Why don't you quit getting up out - in your seat? Nice place to put the biomed on.

09 21 15 00 CDR That's right; my heart feels good.

09 21 15 09 CMP ... get outside on EVA ...

09 21 15 16 CDR (Laughter) Shall we tell them that?

09 21 15 20 LMP To what, did he say?

09 21 15 38 CDR Charlie, you going to have to help me position these.

09 21 15 40 LMP Okay; I'll be glad to.

09 21 15 52 LMP The little dealies are right here.

09 21 15 54 CDR Oh, yeah?

09 21 15 55 LMP On the other end. Right - right here are the stickums, and the - and the sponges are in here.

09 21 16 39 LMP (Sneeze, sneeze) There I go again.

09 21 16 49 CDR Don't hurt your eyes, Charlie - -

09 21 16 50 CC ... whenever you're ready for the geology, ...

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09 21 16 58 CMP Ready, John?

09 21 16 59 CDR Yeah, we're ready.

09 21 17 01 CC Okay. Our first question here on the portable magnetometer - I forgot to re - I forgot to ask you. It was my omission. I was wondering what the temp label on the top - on the electronics box read, if you remember.

09 21 17 20 CDR Tony, you got to be kidding.

09 21 17 25 CC I was afraid of that.

09 21 17 29 LMP (Laughter) You got to be kidding.

09 21 17 33 CC Okay. And for Charlie there, we'd like to verify that on the third EVA when he was driving out to station 11 with the polarizer on, that he used nominal camera settings. He didn't allow for the polarizer.

09 21 17 51 LMP I did just what was on the top of the camera, Tony. Filter - I used 5.6 at 1/25, in the right position.

09 21 18 02 CC Okay. That's fine - that's great - that's what we needed to know. Okay. The next question we'll - we'll get when we get the rocks back, but I think - Well, maybe the best way to do this is to describe a theory that's coming up as a result of the rocks you've - that you saw there. It looks as if - or - a possibility is that an older theory that was discarded a few years ago may be the right one, that the Cayley is an outer fluidized ejecta from Imbrium. Fra Mauro would be an inner ring, and then Imbrium sculpture would be outside of that, and then the Cayley would be sort of slosh that filled up all the valleys farther on out. But some of the questions that the geologists are - are pressing here is something that might help them define that. And a lot of it is that they're just - can't wait for the rocks to get back. But anyway, at station 11, you described some rocks you thought to be tuff. Looking back at station 5 and 6, after seeing these at 11, do you think you might have seen the same kind of rock there? What we're thinking about is where you described the - the square crystals and the needlelike crystals in clasts. And

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also, in the same question, were these crystals by themselves or were these - I mean, were the cras - clasts single crystals or were the crystals in clasts?

09 21 19 38 LMP Recalling station 11, the - the rocks - that big rock in particular was a two-rock breccia, and - I feel. And within the - within the bluish-black matrix, which made up one clast, one of the rock types, there were needlelike crystals in that. And the - the white matrix also had crystals in it.

09 21 20 21 CC Okay. And how - how does - how did those rocks compare to what you saw at station 5 - 5 and 6?

09 21 20 31 CDR I knew they were going to ask these questions. I - may be - Tony, I'm afraid I'm not going to do any better with the answer to these questions than I do on the average field-geology trip where you got 10 stations.

09 21 20 48 CDR And the rocks - -

09 21 20 50 CC Understand.

09 21 20 51 CDR You know, the rocks that we were picking up at 5 and 6, that was a long time before station 11 and - and I - -

09 21 21 01 CC Understand. Don't worry about it.

09 21 21 02 CDR - - I can't remember what the dang rocks looked like, to be honest with you.

09 21 21 05 CC We're gonna have an antenna switch.

09 21 21 11 LMP I think there were some of the same, John.

09 21 21 14 CDR Yeah, but I mean it's entirely speculative to answer a question like that on - -

TIME SKIP

09 21 32 39 LMP The rock was facing - the side we saw them on was away from North Ray.

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09 21 33 01 LMP You need some help with that, John?

09 21 33 03 CDR I'll make it, I think. It's run off somewhere.

09 21 33 11 CC Okay. And - Stand by.

09 21 33 53 CC Okay. Charlie, just before you left the - or during the LM closeout time, you started to make a remark about the change in character between the regolith - between the LM area and Stone Mountain, and somehow we got interrupted there and you didn't finish your statement. I wonder if you could finish what you were going to say - if you happen to remember? Can you characterize the difference in regolith between the LM area and Stone Mountain?

09 21 34 25 LMP Stand by 1 on that one. Did -

09 21 34 28 CC Okay.

09 21 34 32 CDR What you say, Charlie?

09 21 34 33 LMP Those two regoliths seemed to be pretty - pretty much the same, sort of loosely consolidated and you sink right in. The one that I thought was impressive was up at North Ray where you - where it was very shallow, and you didn't sink in at all. Did you - do you remember anything being different about the two regoliths - between the LM and Stone?

09 21 34 59 CDR No, I sure don't. We never stopped between the LM - -

09 21 35 02 LMP No, I mean between - say, up on Stone Mountain and at the LM.

09 21 35 09 CDR Well, the one up at Stone Mountain was clearly a - We just sunk in more because of a lot of downslope debris - -

09 21 35 15 LMP Yeah.

09 21 35 16 CDR - - in there. I'm sure of that.

09 21 35 18 LMP Yeah. Tony, I think that - We're just sitting here trying to decide - recall, and I - right now the only impression is that you tended to sink in more up on Stone Mountain, which could be downslope movement of the particles, and - it was a - just

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very loosely consolidated up there. You - everywhere you'd - you'd step, you'd - you'd sink in a couple of inches. And on the slopes around the LM it was the same way. And even, in fact, where we landed. Up around the ALSEP side, it was very loosely consolidated and as you walked you could - your foot would leave quite a imprint. And once we had pretty well turned over the surface around the LM and up on Stone, it would look like freshly raked ground and - to me. Stone Mountain - Smoky Mountain or, excuse me, North Ray wasn't like that at all. It was very thin regolith and, as we commented, yet we had a tough time raking because it was so rocky right up - within a couple of centimeters of the top of the regolith. Over.

09 21 36 49 CC

Okay. Understand. I think your downslope movement there on Stone was probably - probably right. Although that wouldn't explain why it was harder at 5 and 6 than at 4. Well, anyway. Next question here - On that half-orange-sized rock that you put on the LPM, wonder if you could estimate - estimate how common that type rock was around.

09 21 37 20 LMP

Well, John picked up one just like it up on - It was a grab sample up on Sto - yeah, Stone Mountain. And it - and it - and it was one of the crystalline rocks with that sugary crystalline texture to it.

09 21 37 38 CDR

Like whitish rock?

09 21 37 40 IMP

Huh?

09 21 37 41 CDR

It was the whitish rock?

09 21 37 42 LMP

Yeah. And it was one of those whitish rocks that was a little dusty. I think - I think it's fairly common. We'll just have to see when we get the samples back, but it was my impression it was one of the three predominant rock types there.

09 21 37 57 CC

Okay. Understand. And the soil at station 8 - was it white underneath the top surface like you described up at station 4 and a lot of other stations?

09 21 38 16 LMP

I can't remember. I don't think so. Do you remember that, John?

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Day 10

- 09 21 38 26 CDR We kicked - we kicked some of that and I - I can't remember whether it was or not at station 8.
- 09 21 38 35 CC Okay.
- 09 21 38 36 CDR I think it - Anyway, we sampled a soil sample there, and it is in the - it's in - it's in the box somewhere. But I can't - I certainly can't remember whether it was a - white underneath or not.
- 09 21 38 53 CC Okay. Understand. And just subjectively, could you compare - now that you've been up fairly close to Smoky and on Stone - could you compare the two - two structures?
- 09 21 39 09 CDR They looked the same to us.
- 09 21 39 14 CC Okay. Well, that's - -
- 09 21 39 15 CDR And I - -
- 09 21 39 16 CC - - all of the geology questions.
- 09 21 39 17 CDR Okay, I wouldn't be surprised but what they aren't the same. When Ken and I and Charlie looked at it in this real low Sun angle, I - I guess that's - As far as geometric form, it certainly looked - it was the hummocky material from the Descartes region is - is the way it looked. Right across Smoky - right through that whole region, it looked like a single unit, and - and I guess that would be my interpretation of it at this point. But it's sure speculation, but I would guess that. And I - I wouldn't be surprised but what that we don't find a lot of these rock types from one region very close to another region being about the same.
- 09 21 40 08 LMP Yeah, Tony, that was - I was just going - to add to that I was just - I had the same impression. Looking at the - the South Ray, with the black and white streaks up the wall - up on the interior of the crater, and also at Baby Ray, being very stark in contrast. And then at North Ray, having that same impression but more subdued. And the rocks appearing to be very similar - -

TIME SKIP

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09 21 52 37 LMP See how that stuff powders off on your fingers. Look at that. Look at that white come off. Then that leaves that crystal. Now, you got nothing left but the crystal.

09 21 53 10 CDR Slosh from Imbrium. What a bunch of bull. (Laughter)

09 21 53 16 LMP I wouldn't believe that in a million years.

09 21 53 20 CDR Yeah.

09 21 53 25 LMP They got - they got a new model for the - the Cayley. They said it - Oops! - they say it's slosh - it's a slosh from Imbrium.

09 21 53 40 CMP Bull.

09 21 53 41 LMP That's my opinion, too.

09 21 53 44 CMP That - If it is, then that's a slosh all over the back side of the Moon.

09 21 53 48 LMP Yeah. John and I were just talking. Our - my theory is that the Cayley - We did see some endogenic craters and that - and that - the Cayley is really a tuff breccia - the - the - the plain, and it - because the crystals in this tuff are the same - like this one right here - looked the same as those big rocks that we found up at North Ray and also in the adja - in the secondary craters out of South Ray. So underneath, you could hypothesize a model, and the rocks might prove me entirely wrong - -

09 21 54 24 CC 16, Houston. I've got a few deletions in your Flight Plan.

09 21 54 29 LMP - - you could hypothesize - -

09 21 54 30 CDR Hey, there you go.

09 21 54 31 LMP - - a model of an underlying - -

09 21 54 32 CDR Just a second.

09 21 54 33 LMP - - crystalline basement.

09 21 54 34 CDR You got a pencil, Charlie?

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09 21 54 35 LMP Huh? Yeah.

09 21 54 36 CMP ...

09 21 54 37 CDR Huh?

09 21 54 38 CMP ...

09 21 54 39 LMP No, it's not, either. Somebody swiped it.

09 21 54 45 CMP I just don't find any ... basement rock anywhere ...

09 21 54 50 LMP I'm not - I'm not - I'm not saying total basement;  
I'm just saying - -

09 21 54 54 CDR Okay. Go ahead.

09 21 54 55 LMP - - crystalline rock. And they were crystalline,  
Ken, just a sugar - -

09 21 54 58 CC Okay, at 266 hours.

09 21 55 00 LMP Huh? They were not breccias, I guarantee you.

09 21 55 06 CDR 266 hours. Go.

09 21 55 08 CMP ...

09 21 55 10 CC Roger. Delete "GAMMA RAY, SHIELD, OFF." And ... - -

09 21 55 13 LMP You could see the cry - that rock was a homogeneous  
rock, and you could see the crys - you could hold  
it out, and you could see the crystals.

09 21 55 19 CC - - delete that whole line where it refers to the  
"GAMMA RAY, GAINSTEP, on," et cetera.

09 21 55 25 LMP Just tells me that I found a rock that's a crystal-  
line rock, and it's not a breccia in the true sense  
of the word.

09 21 55 32 CDR That's deleted.

09 21 55 33 LMP That somewhere down there - -

09 21 55 34 CMP ... breccia. (Laughter) ... - -

**CONFIDENTIAL**

09 21 55 36 CC Okay. And at 268 hours, at the top of the page - -

09 21 55 39 LMP That's right, but that is not the - -

09 21 55 42 CDR Go ahead.

09 21 55 44 CMP ... say accretion ... never have ... down there - -

09 21 55 46 CC ... comment.

09 21 55 49 LMP Do what?

09 21 55 50 CMP ... never had ... accretion ... - -

09 21 55 55 CDR Okay. Go ahead.

09 21 55 56 LMP Well, accretion does mean molten.

09 21 55 58 CC That's all of them for right now.

09 21 55 59 CMP ...

09 21 56 00 LMP Huh?

09 21 56 01 CDR Okay.

09 21 56 04 CMP ...

09 21 56 05 LMP I'll tell you what I saw.

09 21 56 06 CMP Okay. I'm coming ... Maybe I'm just getting ...

09 21 56 13 LMP Huh?

09 21 56 14 CMP ... be another ... difficult.

09 21 56 17 CDR Okay - -

09 21 56 18 LMP Oh, sure.

09 21 56 19 CDR We'll be awaiting your call.

09 21 56 20 LMP But in the - in the - in the small little model  
of the 12 kilometer - -

09 21 56 24 CDR Where else would we be?

**CONFIDENTIAL**

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- 09 21 56 26 LMP - - the 12 kilometers that we visited, that is - that is a hypothesis that could - could work. That might not hold true for anywhere else but right there.
- 09 21 56 37 CMP ... hypothesis? You have to prove it if it's a hypothesis.
- 09 21 56 40 LMP I know - I'm saying - it could be totally wrong that - and it's not even a hypothesis, it's a - an impression I have right now - that - and the impression could be proved totally wrong when they look at the rocks.
- 09 21 57 00 CMP ...
- 09 21 57 05 LMP Observations in the rocks we picked up.
- 09 21 57 07 CMP ...
- 09 21 57 10 LMP That the rocks in that South Ray ejecta are the same as the rocks at North Ray. So at least to the depth that they penetrated, there was some crystalline rocks at least to those depths - at those depths. The rocks came out, and there they are; they got to come from somewhere. And then, covering this - all this, and probably - -
- 09 21 57 31 CDR (Yawn)
- 09 21 57 32 LMP - - predating, at least predating the - the - the event, the South Ray event, there was a volcanic episode of - of - of pretty pyroclastic nature that created a tuff breccia, and the clasts in the breccia - in the tuff are the same as the rocks - as the crystalline rocks that you brought back from the secondary craters.
- 09 21 58 00 CMP ... hypothesis ...
- 09 21 58 04 CDR Well, I think they've oversimplified the thing.
- 09 21 58 06 LMP They do.
- 09 21 58 07 CDR The first thing, I think, is that probably that whole area was a big impact thing to start with, see? So then on top of that then happens all these

**CONFIDENTIAL**

things that Charlie's talking about, and then after that - a while later - happens the Imbrium event.

09 21 58 21 LMP Yeah.

09 21 58 22 CDR And I don't think the Imbrium event had beans to do with what went on there. Because I don't think any of those rocks look anything like what they - those guys got up on the -

09 21 58 30 LMP Me either. The Fra Mauro - -

09 21 58 32 CDR Fra Mauro or anything.

09 21 58 33 LMP The rocks are totally different. None of them - they don't - we did not see one rock that looked like any of the other Apollo rocks, not one. Not one!

09 21 58 58 CDR We'll tell them that today at the press conference.

09 21 59 03 LMP Well, I can say it in truths. I don't think.

09 21 59 06 CDR I don't, either.

09 21 59 08 CC Ken, some time when it's convenient - anytime you can get to it, we'd like to get a film status.

09 21 59 16 CDR They want a film status, Ken, anytime you can get to it.

09 21 59 26 CMP ...

09 21 59 28 LMP Okay, Henry, he'll - Thank you.

09 21 59 34 CC Roger. No rush on that, Charlie. Just whenever you work it in.

09 21 59 38 LMP Okay. You mean you want him to pull out every magazine and see how it's doing, or what do you want?

09 21 59 52 CC Let me see how detailed they want it.

09 21 59 55 CDR And ask why! I mean, because we got some of these things stowed where you wouldn't believe. (Laughter) It's not going to be too easy. We're going to have to take the entry stowage apart to get at them.

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09 22 00 21 CC We don't want to unstow anything. If he - if he's got it written down up there somewhere, that would be satisfactory; whatever his records show. If he doesn't, let's just forget about it.

09 22 00 29 CDR Okay. Understand.

09 22 00 30 CMP Hey, Henry, what are you looking for?

09 22 00 34 CC Roger.

09 22 00 37 CMP What are you looking for, Henry? Maybe I can - I can help. If you're looking for mags that have film on them, I - that might not be so hard to track down, but - do you - do you just want to know what pictures we took?

09 22 01 02 CC We got - -

## TIME SKIP

09 22 13 03 LMP ... doing that?

09 22 13 04 CDR ... medical kit back. I'm gonna get the salve out of there and give my arm another dose.

09 22 13 08 LMP How's it looking? Staph got to it yet?

09 22 13 11 CDR It's just - it ain't gonna - it ain't gonna get infected.

09 22 13 16 CMP In an environ - -

09 22 13 17 CDR It's already infected.

09 22 13 18 CMP In an environment like this?

09 22 13 19 LMP It already is infected.

09 22 13 20 CDR I would expect the staph germs run around here two or three times a day, just taking a big bite out of it (laughter).

09 22 13 32 CMP That stuff's supposed to be pretty good, isn't it?

09 22 13 37 LMP No, it ain't worth a darn.

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09 22 13 38 CDR ...

09 22 13 39 LMP It ain't worth it.

09 22 13 40 CMP Sure?

09 22 13 41 LMP Yeah. All it is is some mild antiseptic. That's all it is.

09 22 13 47 CMP Oh, ... local antibiotics get absorbed in the tissues [sic] and all that stuff.

09 22 13 58 LMP ...?

09 22 14 02 CC 16, your tape recorder is running forward.

09 22 14 04 CMP Okay; thank you, Henry.

09 22 14 45 CDR Watch your foot there, Charlie.

09 22 14 47 LMP Wait a minute, John. You got to put this back in there.

09 22 14 51 CDR Oh.

09 22 14 53 LMP There you go.

09 22 14 54 CDR I think I'm losing my mind.

09 22 14 59 CMP Houston. We're having to take drastic measures. Our commander has lost his mind.

09 22 15 11 LMP ... - -

09 22 15 13 CDR Take over the ship and go to Mars.

09 22 15 14 LMP I'm good at this. Turn off the lights (laughter).

09 22 15 20 CDR The only reason we're doing this experiment is because Charlie excels at it (laughter).

09 22 15 24 CMP My feelings are hurt. I can see them, too, a little.

09 22 15 28 CDR Man, I don't - I have been looking for those darn things. Maybe I'm looking too hard or something. I can't see anything. It's really frustrating.

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## TIME SKIP

09 23 16 07 CDR ...., Ken.

09 23 16 08 CMP Oh, yeah. I'll get it.

09 23 16 10 LMP We ought to clean this. This hose has gotten filthy.

09 23 16 15 CMP What's filthy?

09 23 16 16 LMP That hose - that inlet hose on my side - -

09 23 16 18 CDR ... some - tape?

09 23 16 19 LMP Need a piece of tape.

09 23 16 21 CDR I'll get it for you, Charlie, ...

09 23 16 23 LMP Okay.

09 23 16 24 CMP You got the Flight Plan or something?

09 23 16 25 LMP John's got it.

09 23 16 27 CDR Yeah, I got it. Here you go, Ken. Too-do-do-do.

09 23 16 33 CMP And John's got a pencil, bet you.

09 23 16 34 CDR Yeah, I got the pencil you bet me. We ain't got too many pencils. I hope we can get back without too many more Flight Plan changes.

09 23 16 42 CMP (Laughter)

09 23 16 52 CDR Shucks, I don't see the tape. There it is. We should have brought the tape over from the LM.

09 23 16 57 CMP It's right down here.

09 23 16 58 LMP I know it. I forgot it. Oh, ...

09 23 17 07 LMP Here you go, John.

09 23 17 11 CMP Hank, what was the jet you wanted to have me turn off?

**CONFIDENTIAL**

09 23 17 14 CDR B3?

09 23 17 16 CC Roger. Bravo 1 so it won't fire in the SIM bay - -

09 23 17 17 CMP Bravo 1.

09 23 17 18 CC - - if you used Bravo 2 and Delta 1 for roll, you'll be okay just to leave that configuration and maneuver on to the next attitude.

09 23 17 36 CMP You want to use Bravo 2 and Delta 1. Is that affirmative?

09 23 17 44 CC ... affirmative.

09 23 17 48 CDR When do we get to dump urine, man? I got to dump so bad I can taste it.

09 23 17 54 LMP Why don't you go in that - squirt it in that white bag?

09 23 17 55 CDR Okay.

09 23 17 57 LMP It's a while before we get to dump.

09 23 17 59 CDR I recall.

09 23 18 02 CMP Okay, Hank. They - that's not the jet configuration they gave us this morning because I did have the SIM bay jets - No, I'll have to look up those jets I had this morning, but Bravo I was one of the ones I had turned on.

09 23 18 23 CC Roger. We understand that, Ken. The reason is that when we stop the PTC, the - we're - in the configuration you had, you'd probably use - you'd have to use Bravo 1 to stop it, and it would fire into the SIM bay. It probably never fired during PTC.

09 23 18 45 CMP Okay. I see what you mean.

09 23 18 46 LMP Boy, you have been frugal on the gas, Ken.

09 23 18 47 CMP It ain't stopping. How come?

09 23 18 56 CDR What ain't stopping, Ken?

09 23 18 59 CMP Oh, you can't do that. That's right.

**CONFIDENTIAL**

09 23 19 25 LMP Hey, we get to dump here in just a minute, John.

09 23 19 29 CDR What time?

09 23 19 30 LMP In about 50 minutes.

09 23 19 36 CDR How nice.

09 23 20 33 CMP That's gonna be minus 40 and YAW 90.

09 23 20 37 LMP On the high gain?

09 23 20 38 CMP Yeah.

09 23 20 46 LMP Wonder what we got.

09 23 20 50 CMP It's REACQ.

09 23 20 53 LMP From REACQ to NARROW.

09 23 20 56 CMP Okay.

09 23 21 04 SC (Yawn)

09 23 21 08 CMP Now, you went and changed dead band to 2 degrees in there ... - -

09 23 21 12 LMP That's right, I did.

09 23 21 13 CMP Oh.

09 23 21 14 LMP For this. And I didn't know whether that - what that'd do - they said to change NOUN 79 dead band to 2 degrees. I didn't know what number that was.

09 23 21 23 CMP That's good. You did it right.

09 23 21 37 CDR When's the press conference? It's a long ways from now, isn't it - 4 hours?

09 23 21 40 LMP (Yawn) Yeah.

09 23 21 42 CMP Hank, this one you want to do as a normal PTC, or do you want to use - -

TIME SKIP

**CONFIDENTIAL**

09 23 57 04 CDR When's that old exercise period start?

09 23 57 06 CMP I think next hour.

09 23 57 08 CDR Yeah. Hardly wait to get ahold of that Exer-Genie; I'm gonna tear it to pieces.

09 23 57 24 CDR Must be getting near the Earth; my sinuses are starting to bother me again.

09 23 57 37 CMP How about let's do some water dumps.

09 23 57 40 CDR Hey, yeah. Can we do that now?

09 23 57 45 CMP ... It says we can purge the oxygen from the fuel cell, urine dump, waste water dump - -

09 23 57 52 CDR Okay, what you want to set on here? It's reading 65 now. We're supposed to purge to what, 49?

09 23 57 57 CMP Forty-nine. So that's only 15 percent.

09 23 58 00 CDR Fifteen percent at 5 minutes?

09 23 58 02 CMP Five percent a minute.

09 23 58 04 CDR Three minutes? You want to put 3 minutes - I'll put 2-1/2 on there.

09 23 58 07 CMP Yeah.

09 23 58 09 CDR Is it running? Times 10?

09 23 58 11 CMP I think you need to - All righty.

09 23 58 19 CDR Okay.

09 23 58 20 CMP And open her up.

09 23 58 36 CDR Okay, that's under way.

09 23 58 54 CDR Here, let me put your - your little bag in there.

09 23 58 58 CMP Okay. Thank you. And let's see. I'll get a little oxygen purge going here.

09 23 59 08 LMP What time does the urine dump start?

**CONFIDENTIAL**

09 23 59 11 CDR Oh, flowing right now.

09 23 59 12 CMP Let's wait until - let's do these things one at a time. They're gonna try to get something out of that. Let's at least give them a halfway chance.

09 23 59 19 CDR I don't want to give them a halfway chance. I don't think they deserve it, Ken. You're just being overly nice to them. You want to look out the window and see if you can do it, or -

09 23 59 29 CMP Okay. Just a second, I'll - Sure will. Okay, I got the first oxygen under way.

09 23 59 41 CDR It's - it's raining!

09 23 59 46 CMP Man, is it ever raining.

09 23 59 48 CDR Man, is it ever. We'll leave the window open; that'll be a clue something's going on out there.

09 23 59 53 CMP (Singing) It's raining, it's pouring. Well, I need some music to dump urine by.

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## DAY 11

10 00 00 02 CDR Music to dump by; I was just gonna suggest that.

10 00 00 05 CMP What kind of music is fitting, though?

10 00 00 08 CDR You might try the -

10 00 00 13 CMP Oh, heck, I think it got knocked out on the - It did. That battery!

10 00 00 19 CDR Where do they keep those?

10 00 00 21 CMP They go in a little bag. We finished that one, anyhow. They go in a little bag up here. I think they're in that far side with the little bitty Bull Durham sack.

10 00 00 32 CDR In here?

10 00 00 33 CMP Yeah, I think so. The little drawstring in the top?

10 00 00 42 CDR Yep. Are these the new ones or the old ones? There you go.

10 00 00 49 CMP I think we need another 2 minutes.

10 00 00 53 CDR The old ones have been thrown away, so we won't get them confused. Another 2 minutes to dump, right?

10 00 01 01 CMP Yeah.

10 00 01 04 CDR Going down to 60 percent now. Only supposed to go to 49, didn't you say?

10 00 01 10 CMP Yeah. What kind of music is a good music to dump by?

10 00 01 15 CDR (Singing) Music to dump by - How's your oxygen purge going?

10 00 01 29 CMP It's about time for the first one to come off.

10 00 01 31 CDR Okay.

10 00 01 33 CMP Put the second one on.

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Day 11

10 00 01 36 CDR Put the second one on. That's oxygen, right?

10 00 01 39 CMP Right. Okay.

10 00 01 41 CDR It's on.

10 00 01 42 CMP Okay.

10 00 01 51 CMP Think this is - ... popular music sandwiched on the end ... where it is.

10 00 01 58 CDR If they'd have had the same problems we had on Apollo 8 - Borman was going out of his mind - he'd have shot himself.

10 00 02 04 CMP I don't really blame him.

10 00 02 06 CC 16, Houston. We show you 55 percent on the waste tank. I'll give you a call at 50.

10 00 02 12 CDR We're watching it, Henry.

10 00 02 14 CMP He knows from past experience it ain't good enough.

10 00 02 17 CDR It ain't good enough from past experience is what you're saying?

10 00 02 23 CC I'm not saying that at all, John.

10 00 02 26 CDR Okay.

10 00 02 27 CC Just thought I would help if I could.

10 00 02 31 CDR You are, Hank. We're just teasing.

10 00 02 48 CDR Looks like 49 to me.

10 00 02 50 CMP Okay, turn it off.

10 00 02 51 CDR Looks like 49 to us. Go; don't talk about it.

10 00 02 54 CC Roger. We show about 50 now.

10 00 03 00 CDR I can't find the switch.

10 00 03 06 CC MARK; 50 percent.

10 00 03 08 CMP Got it? John?

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10 00 03 09 CDR Yeah. Okay, she's shut down.

10 00 03 18 LMP Got that ...

10 00 03 20 CMP No, not yet. It's only 1 minute. Okay, there's 2 minutes. Off.

10 00 03 33 CDR Okay.

10 00 03 34 CMP Number 3. Go.

10 00 03 35 CDR ...

10 00 03 50 CMP That's really a beautiful sight, though.

10 00 03 51 CDR It really is.

10 00 03 53 CMP You know what that reminds me of? You know these things that people have ... these little desk things and all with the - the fluid and a whole bunch of - -

10 00 04 01 CDR Looks to me like - -

10 00 04 02 CMP - - particles in it that looks like snow, and, you can turn it over and it stirs it all up? That's just what that looks like to me.

10 00 04 07 CDR Looks to me like snowing at night in bright light.

10 00 04 10 CMP Yeah. It's really beautiful. I hope those - those stereo pictures might show that. I hope so. I really want to do that part of the experiment right today, because I think that would be a beautiful picture to show. I guess we can get on with the urine dump.

10 00 04 36 LMP I'll get out of ... I got it.

10 00 04 41 CMP Why don't you dump my little bag first? You need a mark on that?

10 00 04 53 LMP What do you want to do, Ken, first?

10 00 04 55 CMP Dump my little bag first.

TIME SKIP

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10 00 16 29 CDR - - ... these circuit breakers ... - -

10 00 16 31 CC ... dump ...

10 00 16 42 CDR That's affirmative.

10 00 17 11 LMP ... switch to off, then ...

10 00 17 14 CMP Okay. I'm gonna turn the dump valve off and change filters.

10 00 17 30 LMP Okay, back to dump.

10 00 17 31 CMP Going back to dump.

10 00 17 34 LMP It's at 50 now.

10 00 17 37 CDR Yeah, it doesn't seem to be making much difference, Charlie. In fact, that's good to hear. When you went back to dump, it - it got pretty good.

10 00 17 45 CMP Yeah, but it's not dumping like it was officially, you know, that big range.

10 00 17 49 CDR Yeah, well, that's a function of Sun angle.

10 00 17 52 CMP Okay. Maybe that's it. The error - that's a function of Sun angle on the ... Okay. We'll buy that. You know, I was surprised how little stuff there was on that urine bottle, when I was out there.

10 00 18 05 CDR Oh, yeah. We took pictures of it.

10 00 18 07 CMP No, it was up in ... - -

10 00 18 08 LMP ... another bag ...

10 00 18 10 CDR Okay, we're starting another bag.

10 00 18 16 CMP Oh, hey, there's one that'll look good, the dark shadow. You can see a lot more.

10 00 18 19 CDR Yeah, you can see a lot.

10 00 18 21 CMP We're still losing ... - -

10 00 18 23 LMP Bag's empty.

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10 00 18 26 CMP Bag's empty.

10 00 18 41 CMP Maybe that's what we should have done before the EVA, Charlie, was to have a big water dump, so it wouldn't have looked so black.

10 00 18 48 CDR (Laughter) Well, I'll put a little water in your ... (laughter).

10 00 18 56 CMP If the headshrinks would like to listen to that, that way we wouldn't be scared.

10 00 19 00 CDR That's right (laughter). I'm proud to hear you guys were a little nervous about something around here. I thought y'all were completely fearless there for a while.

10 00 19 12 CMP I've had more high heart rates in the last 2 weeks than I have in my whole life.

10 00 19 18 CDR Pretty exciting business.

10 00 19 21 CMP The thing that galls me about these shrinks and everybody else is - just like the way they tackle zero g in the body. Instead of fighting the thing and trying to make you live in a protected environment, you ought to learn to live in the environment you're in.

10 00 19 34 CDR Yeah.

10 00 19 36 CMP Let man adapt to zero g. Quit trying to force his body to stay in one-g condition, because it isn't gonna work.

10 00 19 45 CDR But if you provide him with one g, it ain't gonna work. I've been trying to tell them that. I told them, listen, if you want a guy to stay healthy in zero g that can - so he can hack it when he gets back, you gotta give him that one-g feel.

10 00 19 55 CMP Right. And there's no future in that. That negates all the reasons for going into zero g.

10 00 20 00 CDR Well, and there's - you know - there's places on a spacecraft you could make it on, where you could put a - you could - you could put some ... - -

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Day 11

10 00 20 07 CMP Yeah, but it's not productive. You'd have to spend 6 hours, 8 hours a day doing that.

10 00 20 12 CDR You'd have to spend a lot of time in your zero - -

10 00 20 15 CMP Well, just - just getting adapted to one g.  
(Laughter) You know, who - who needs it? I bet you the old bod is gonna taper off here and settle down and be just happy as a clam. So all it means is when you come home, you're gonna be kind of like a vegetable for a while, if it gets real bad.

10 00 20 30 CDR Yeah.

10 00 20 32 CMP And you just learn to live with that. The only place I see a hazard is in recovery. If you had to really exert yourself - -

10 00 20 40 CDR Then that's really what we'd do, you watch.

10 00 20 43 CMP I think I'd find a way to do that (laughter).

10 00 20 46 CDR You watch. You may have the opportunity tomorrow or the next day.

10 00 20 50 CMP That's right.

10 00 20 54 CDR Yeah, recovery is just a different environment. We do have not much of it.

10 00 21 00 LMP What do you mean, John?

10 00 21 02 CDR I mean, once you get in the ship, you're in danger of sinking. (Laughter) That's what I mean, Charlie.

10 00 21 07 LMP You're what? You're in danger of sinking? Oh. I tell you, I - -

10 00 21 11 CDR You don't have to worry about space, but you've got to worry about swimming.

10 00 21 15 CMP Yeah, I - I ain't so impressed with - I ain't going to be breathing easy until my fanny is on that ship.

10 00 21 19 CDR I ain't either. I never have been impressed by the way those guys pick you out of the water.

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10 00 21 24 CMP Well, I - I'll actually feel pretty good when they get a collar around this boat.

10 00 21 29 CDR Yeah, me too.

10 00 21 31 CMP Until they get a collar around this thing, I ain't going to be very comfortable, because my experiences with the stable II egress from this son of a gun have always been bad (laughter).

10 00 21 41 CDR Yeah.

10 00 21 49 CMP That's so pretty. That's just beautiful. Somebody would think you're nuts if you said there's nothing prettier than urine dumps. (Laughter)

10 00 22 00 CDR They're going to wonder why we have a million pictures of those ... just fabulous.

10 00 22 05 CMP The problem is, people have been setting focuses wrong, for one thing. What - what is the proper intensity to set this thing? I think these particles are real bright.

10 00 22 14 CDR They are.

10 00 22 19 CMP You keep a focus setting very close.

10 00 22 23 CDR Yeah.

10 00 22 26 CMP I wonder if - No, our TV just doesn't have the resolution to show that kind of stuff. It's a shame.

10 00 22 34 LMP Do we have another eat period before TV?

10 00 22 37 CDR Yeah.

10 00 22 40 CMP About time for me to dump my bag down there?

10 00 22 43 LMP Oh, yeah; just a minute.

10 00 22 46 CMP I don't want to ask you to do that, because it - because it's kind of Rube Goldberg.

10 00 22 50 CDR Dumping water?

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Day 11

10 00 22 51 CMP Yeah. Let's turn the heaters off, okay?

10 00 22 58 CDR I don't want the - You want me to turn them off now, right?

10 00 23 01 CMP Yeah.

10 00 23 02 CDR Okay.

10 00 23 04 CMP Now you can stop and do the hydrogen purge.

10 00 23 05 CDR You mean really stop, and - -

10 00 23 06 CMP ... stop ... nominal. (Laughter) Okay.

10 00 23 11 CDR Where's the Exer-Genie?

10 00 23 13 CMP It's in my TSB.

10 00 23 15 CDR Is it still, huh?

10 00 23 18 CMP Yeah. I used it several times when I was solo. Finally worked out a pretty good routine. But I have absolutely no confidence (laughter) in those guys, because they'll let you do anything - -

10 00 23 30 CDR ISS light.

10 00 23 32 CMP Could you cut - No. Okay. Okay.

10 00 23 44 LMP Temporary ISS?

10 00 23 45 CDR Right.

10 00 23 46 CMP 37777.

10 00 23 47 CDR CDU failed.

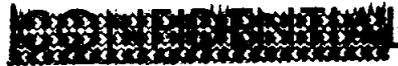
10 00 23 50 CMP Okay.

10 00 23 52 CDR Okay, Houston, we've got an ISS light and a 37777, and the - -

10 00 24 01 CC ...

10 00 24 03 CDR Okay, the eight ball didn't move. It's a CDU fail light's what it is.

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10 00 24 13 CMP 82, that's good. 130, that's good ... Okay, NOUN 20s all look pretty good.

10 00 24 22 CDR Yeah, ... all look - -

10 00 24 23 CMP Okay.

10 00 24 33 CMP See if you hit that switch button accidentally.

10 00 24 35 CDR It's there. Okay, no switches were being touched at the time.

10 00 24 45 LMP Must have been a glitch, huh? One of the glitches?

10 00 24 49 CMP I'm glad it wasn't the middle gimbal, for a change.

10 00 24 51 LMP What gimbal was it?

10 00 24 53 CMP You can't tell.

10 00 24 57 LMP Are we in att hold?

10 00 24 58 CMP I am now.

10 00 24 59 CDR Gonna reset - -

10 00 25 00 CC ...

10 00 25 05 CDR Want me to repeat that program alarm? Okay, program alarm reset.

10 00 25 21 CMP (Laughter) Oh.

10 00 25 25 CDR A CDU failed transient, huh?

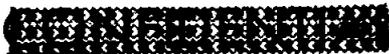
10 00 25 28 CMP Well, let's not outguess it. We did that once, maybe. Maybe all our flap was for naught. Maybe we ought to ... (Laughter) The nice thing about this, John, is that with the CDUs out, we can still do a perfectly good entry.

10 00 25 47 CDR You'll have to gimbal.

10 00 25 49 CMP That's right.

10 00 25 50 LMP With what?

10 00 25 51 CMP G&N controlled entry.



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10 00 25 52 LMP You can?

10 00 25 53 CMP I sure can.

10 00 25 54 LMP Good.

10 00 25 55 CDR He can do it with G&N controls.

10 00 25 56 LMP How do you do that?

10 00 25 57 CMP CDUs only talk to the computer.

10 00 25 58 LMP Yeah.

10 00 25 59 CMP They don't talk to the eight ball. And it - it thinks inertially. The platform just sits there and it does its thing, and it takes those accelerometers and integrates them and says, man, you need to go a little long. And if you needed to go long, you ought to have 112 degrees bank, and we just roll 112 and we'll plop it right in the same place the computer - -

10 00 26 16 CDR You'd have to adapt it.

10 00 26 17 CMP Yeah. But it's got the same accuracy that the G&N has.

10 00 26 25 CDR We already found that out, didn't we?

10 00 26 27 LMP I hate to tell you, but that brought on a "Shhh."

10 00 26 30 MS (Laughter)

10 00 26 33 CDR We'd better hurry. We got to give a TV show in - -

10 00 26 35 CMP (Laughter)

10 00 26 37 CDR - - in 3 hours.

10 00 26 38 LMP Three hours?

10 00 26 41 CMP Yeah, thanks.

10 00 26 43 LMP Do you want to dump your stuff down here, Ken?

10 00 26 45 CMP Yeah, I guess.

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10 00 26 46 LMP Or do you want me to do it?

10 00 26 48 CMP Let me stop and take a second look. That sure got my attention. I thought John was playing games - -

10 00 26 57 LMP I turned around and looked at that, and I saw the PGNS light and the ISS light on down there.

10 00 27 05 CMP Well, at this point, I feel pretty comfortable even without the PGNS. Because ain't nobody going to NO-GO entry.

10 00 27 15 CDR That's for sure.

10 00 27 16 CMP At least not up my watch.

10 00 27 18 LMP I'd sure like - like to have that guidance working, though.

10 00 27 22 CMP Well, got to have a little stick time.

10 00 27 28 LMP It's a mighty big ocean.

10 00 27 29 CMP (Laughter) I would like for it to come in automatically, too, Charlie; don't worry. My desire to be a hero does not mean I want to fly manually, just to prove you can do it.

10 00 27 42 CDR Now, Ken, you can do it. And I want you to prove it. (Laughter)

10 00 27 46 CMP We will - if we need to, we will put it down right there, but I'd just as soon go automatic. I believe in computers.

10 00 27 54 CDR Yeah, I believe in computers, too.

10 00 27 57 LMP That - that warning light was like going in the gym, Ken. (Laughter) Automatic constipation reliever (laughter).

10 00 28 07 CMP Man, I'll tell you, the way I've been - the way I've been having to go lately (laughter). I'm really getting worried; if I were in the gym now, I would never stop.

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Day 11

10 00 28 16 LMP Are you going to dump that thing through a filter and everything, Ken?

10 00 28 19 CMP No. I'm going to dump it through the little filter.

10 00 28 22 CDR Okay.

10 00 28 23 CMP I got to use the other end of that big filter - -

10 00 28 25 LMP Close it.

10 00 28 26 CMP - - of the urine hose here.

10 00 28 31 CDR Now promise me you're not going to clog up the urine tube. You ain't gonna promise me that, are you? (Laughter)

10 00 28 38 LMP John?

10 00 28 40 CDR Yeah?

10 00 28 41 LMP This is the last dump anyway.

10 00 28 43 CC ... - -

10 00 28 44 CMP Have - have - ask him to hold on.

10 00 28 47 CC - - ...

10 00 28 50 CMP Ask him to hold on and we'll be there. And the Mal Procedures are up there in the little ... box.

10 00 28 55 LMP Okay. Stand by.

10 00 28 58 CMP That - they're in that box that's so hard to get to, Charlie.

10 00 29 00 LMP Yeah, I know.

10 00 29 01 CMP That's normal. Gosh. Who turned the lights off? We got a burned out light in one of the pumps down here. Let's see, scissors. Hold that for a second.

10 00 29 17 LMP Can you reach it?

10 00 29 21 CDR What could that be about?

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10 00 29 25 CMP Could what be about? The first thing I'd do is run a P52 and see if it knows where it is.

10 00 29 37 CDR No, it's a - The REFSMMAT flag is still set.

10 00 29 44 CMP We can check all those - -

10 00 29 46 CDR The angles are good; it's got to know where it is, doesn't it? Better just keep you eye on that flag - -

10 00 29 51 LMP Yeah, you - you could - -

10 00 29 52 CDR - - auto - auto transient wouldn't kill the REFSMMAT flag, would it?

10 00 29 56 CMP Why don't we just go through this procedure and see what it says.

10 00 29 57 CDR Okay.

10 00 29 58 CMP Let me take care of all those things in an orderly, thought-out fashion.

10 00 30 02 CDR Yeah, okay. Why don't I just move over here, and ... - -

10 00 30 06 CMP How's the dump looking?

10 00 30 11 CDR Still dumping.

10 00 30 14 CMP Man, on the - Look at that! Look at that!

10 00 30 16 CDR You're dumping like crazy.

10 00 30 18 CMP It worked.

10 00 30 19 CDR There it goes again.

10 00 30 20 CMP Okay, we're in SCS mode. It doesn't matter.

10 00 30 25 CDR Watch it. Okay, we just had the program alarm again.

10 00 30 36 CMP ... first and two.

10 00 30 47 LMP Here you go, Ken.

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10 00 30 50 CMP ...

10 00 30 51 LMP Here you go, John.

10 00 30 52 CDR Okay, I'll get it in a second. I got that purge - -

10 00 30 55 CMP Again?

10 00 30 56 LMP Yeah.

10 00 31 01 CDR Drive us crazy.

10 00 31 02 CMP Well, if it's a bit failure, we can avoid that by going around it. Let me get in there and work on that thing for a moment.

10 00 31 16 CMP Okay, I'm turning this thing off and it's not - the hose isn't hooked up to anything, Charlie.

10 00 31 21 CDR What - what - what - what G&N? Number 6, is that the one that - -

10 00 31 25 CMP Yeah. That's the one. Why don't you let me in there?

10 00 31 35 CMP Why don't you let me slide in there, Charlie?

10 00 31 36 LMP Oh, excuse me.

10 00 31 38 CMP No, you're okay.

10 00 31 39 LMP Reach it?

10 00 31 40 CMP Yeah. Hey, John?

10 00 31 41 CDR Yeah?

10 00 31 42 CMP They slide in there.

10 00 31 43 CDR In here?

10 00 31 44 CMP Yeah.

10 00 31 45 CDR Okay. Okay, the program alarm resets. This is a nuisance.

10 00 31 51 CMP Well, let's - We've got nothing else to do.

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10 00 31 54 CDR The answer is transient ISS condition.

10 00 31 56 CMP Okay.

10 00 31 57 CDR Program alarm reset.

10 00 31 58 CMP Okay.

10 00 32 00 CDR SPACECRAFT CONTROL, SCS. And - Okay, then it says alarm code. No, the ... came off. It just came on again. Alarm code, ICDU to A/D check.

10 00 32 21 CMP Did we get both the ISS and the program alarm?

10 00 32 24 CDR Yeah.

10 00 32 25 LMP I have P on the - -

10 00 32 26 CMP Every - every time?

10 00 32 27 CDR Every time to my - Yeah.

10 00 32 28 CMP Okay, I did - I haven't seen the ISS light.

10 00 32 32 LMP Well, I - it is on down there.

10 00 32 34 CMP That's the PGNS light down there - -

10 00 32 35 LMP No, there's an I - -

10 00 32 36 CMP Oh, what's it look like?

10 00 32 37 CDR - - right there ... - -

10 00 32 38 CMP I only saw the - -

10 00 32 39 CDR - - my ISS light wouldn't come on, and so - -

10 00 32 40 LMP ...

10 00 32 42 CMP Every time?

10 00 32 43 LMP Every time.

10 00 32 44 CMP Okay.

10 00 32 45 CDR I've been watching it, because it goes out - -

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10 00 32 46 CMP Does everybody - -

10 00 32 47 CDR - - which is why you - -

10 00 32 48 CMP Okay, but it goes out.

10 00 32 49 CDR I don't give a darn; I seen it.

10 00 32 50 CMP All right, John. I'm not saying it didn't come on, I'm saying it goes out as soon as the condition goes away.

10 00 32 53 CDR Okay. Well, it's been going out just like that, too.

10 00 32 55 CMP Okay. So it means that - right there, you know that it's a - it's a hardware-caused thing and not a software. And let her do - -

10 00 33 05 CDR Okay, ... again?

10 00 33 08 CMP That's strange. Let's - let's do this thing, even if it only takes us to block 5.

10 00 33 17 CDR ... get an answer.

10 00 33 26 CMP Okay, Hank. When we go into number 6 procedure, we come down and the logical answer out of block 2 is that the - the - you can reset the program lights, and the ISS light goes off all on its own; it's only on for a very short period of time. And that says that the transient condition stops. I guess we could take a look at - going down through the "No" path and try a block 6, but I'd like to have some concurrence on that before we do it.

10 00 34 05 CC ...

10 00 34 10 CMP You had some bad comm there. I understand you want us to go to block 6.

10 00 34 15 CC ...

10 00 34 16 CDR Okay, let's do - let's do - why don't you do a VERB 16 NOUN 23?

10 00 34 23 LMP Y'all don't need the old IMP for that.

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10 00 34 26 CMP ... and count. Yeah, before we started on that, we decided to take a look at 16 20 and it seems to be counting in all three axes, and they agree with what's on the FDAI.

10 00 34 49 CDR And the SCS.

10 00 34 52 CMP We're going to start in the block 40 now. And I'm going on the VOX so I can talk and read at the same time.

10 00 35 01 CC ...

10 00 35 10 CMP Say again, Hank. You - you're blocked out right in the middle.

10 00 35 15 CC ...

10 00 35 25 CMP I - I repeat, the FDAI and the NOUN 20s look like they're in as close agreement as I can read.

10 00 35 32 CDR You can't tell the degree on FDAI down here anyway. I mean, there's that much dispersion in the instrumentation. You know that. Idiots.

10 00 35 44 CMP Okay, can we proceed?

10 00 35 55 CMP Okay, we ... and it's counting again and it's going back to the same numbers. No, it just blanked again. Let's see here. Maybe I was premature.

10 00 36 07 CDR What happened there?

10 00 36 15 CMP That's where it zeroed. Yeah, it - it's still showing about the same numbers, Hank. The biggest change was in the - No, they're all - they're all ball park, within readability, from one reading to the other. Okay, so out of that, I come up with a "Yes" answer and I'm going - looking at block 12.

10 00 37 00 CDR Want to load that?

10 00 37 23 CMP I guess in order to do this block 12, I have to be in CMC CONTROL; is that not correct?

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10 00 37 46 CMP Okay, I have no displacement. I did a VERB 43 ENTER, and then I loaded R-1, -2, and -3. And I got no needle displacement. Is there another ENTER required or something?

10 00 38 08 CC ...

10 00 38 15 CMP Oh.

10 00 38 26 CC ...

10 00 38 32 CMP Okay. There's VERB 43 ENTER, plus 00250 ENTER, plus 00333 ENTER, plus 00333 ENTER. And the needles pulsed out and right back to zero.

10 00 39 20 CC ...

10 00 39 22 CMP That's correct.

10 00 40 02 CDR ... that.

10 00 40 07 CC ...

10 00 40 18 CMP What did he say?

10 00 40 20 LMP Said stand by a little bit and they'll digest this.

10 00 40 22 CMP Oh. Okay.

10 00 40 26 CDR Let me - -

10 00 40 27 CMP Well, the very first thing to do is to just find out if I have a good alignment. It could well be the detec - the detection circuit.

10 00 40 39 LMP What - what angle are we, Ken?

10 00 40 42 CMP 180 roll, 40 degrees yaw, and 130 degrees in pitch.

10 00 40 50 LMP You know, lots of times when those things happen, it depends on - you can just be in a certain attitude and it'll happen - -

10 00 40 55 CMP Yeah, yeah, yeah. Sorry - sorry you got to isolate that to a bit when it's - -

10 00 41 02 LMP Yeah.

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10 00 41 03 CMP -- giving you the problems, so you don't have -  
which one - which attitudes to avoid.

10 00 41 31 CDR It's just like a sim (laughter); 24 hours out  
instead of 2 ... - -

10 00 41 38 CMP Yeah, ... - -

10 00 41 40 LMP Yeah, translunar coast sim, transearth coast  
(laughter).

10 00 41 48 CMP Well, I'd sure rather have these problems here  
than in lunar orbit.

10 00 41 53 LMP Me, too.

10 00 41 54 CDR You'd better believe it. Yeah, did we - would -  
would we still be in lunar orbit?

10 00 41 59 LMP No, we'd be on the way home - -

10 00 42 01 CMP No, we'd have been on the way home.

10 00 42 02 LMP - - but 48 hours away instead of -

10 00 42 03 CMP I sure hope that that doesn't prove - You know,  
that's like McDivitt looking at that - what was  
it that happened there, and you could see he really  
made the right decision when he decided to delay  
the launch even though the information that made  
it the right decision occurred after he made his  
decision. (Laughter)

10 00 42 19 CDR Yeah, I get a chuckle out of that.

10 00 42 24 CMP Fortunately, he's - he's the kind of a guy that's  
... used to kidding, though. Other people, I  
think, might believe that kind of reasoning.

10 00 42 41 CMP I wonder what the good boss is going to go do? He  
must have a - I would think running - running ASPO  
would be enough of a - of a challenge to be worth  
staying around for. He must have an awfully good  
job offer.

10 00 43 01 CDR Any good job offer would be better than that.

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10 00 43 04 CMP What? Running the program? Why do you say that?

10 00 43 08 CDR His hair is gonna turn gray ...

10 00 43 14 CMP That's what makes it a challenge. (Laughter)

10 00 43 18 CDR His ulcer is what makes it - -

10 00 43 20 CMP That's going to be true in any job you go to. There's probably more talented people working in MSC, and working with NASA, than in any other organization, per capita, unless you get some little group like Bellcomm or something where - and they got their share of them. Strange.

10 00 43 56 LMP (Heavy breathing) ... over there.

10 00 44 10 CMP Hey, what have you got that thing set on?

10 00 44 12 LMP ... I'm talking - -

10 00 44 13 CC ...

10 00 44 20 CMP Okay. Would you like for me to try it in the CMC CONTROL, and then I'll go to ACCEL COMMAND so we don't get any attitudes.

10 00 44 45 CDR I'll read it up to you, Ken. VERB 43E, load R-1, plus 2 - plus 00250; in R-2, plus 00333 ENTER. Whoa! Look at the eight ball.

10 00 45 09 CDR As soon as you (laughter) ENTER, the needles - they -

10 00 45 16 CMP Funny thing, Hank. As soon as I hit ENTER, they pulse out and it looks like they go where they belong, and then as soon as it comes back, it just goes out and comes right back.

10 00 45 25 LMP Is that normal?

10 00 45 28 CMP No.

10 00 45 29 CDR You ever run it before?

10 00 45 30 CMP Yes, sir.

10 00 45 31 CDR Okay.

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10 00 45 33 CMP No, they should go out and stay until you zero them.

10 00 45 36 LMP That's what I would think.

10 00 45 40 CMP Yeah, I've run this procedure before. It's -

10 00 45 46 LMP What is that an indication of, when it goes out?

10 00 45 48 CMP Our digital-to-analog section has failed, and we can check that by seeing - Let's see - What - what uses the D-to-A's? The gimbals? The gimbal drive unit uses D-to-A's.

10 00 46 05 CDR No, don't turn the ... gimbals on, Ken.

10 00 46 09 CMP Well, John. The - the reason it's important to you is that this is the way you also coarse align the platform.

10 00 46 14 CDR I don't want to coarse align the platform ...

10 00 46 18 LMP Got to get - got to get entry REFSMMAT.

10 00 46 20 CDR Oh, I know.

10 00 46 22 CMP Okay. But that's - -

10 00 46 24 CDR ...

10 00 46 25 CMP - - that's something you got to start very, very early on.

10 00 46 28 CDR I know that.

10 00 46 29 LMP Why don't we do that?

10 00 46 30 CMP Yeah, but only if you plan to do it.

10 00 46 34 CDR Yeah, that's what I say - -

10 00 46 35 CMP Yeah, I mean, that can also - -

10 00 46 36 CDR - - in order to finish this loop, we got - we got to fine align the platform.

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10 00 46 38 CMP Yeah. Well, what I would like to do is to find out if we've lost that loop. Like right now, even if - even if the gimbals ..., I'm not sure I would be willing to try to get the coarse align.

10 00 46 46 CDR Yeah, but we've got 24 hours to find that out anyway.

10 00 46 50 CMP Hey, John, the only other thing besides the coarse align loop that I can think of that - that uses the D-to-A section -

10 00 46 54 CDR Yeah. That's what it says over there. Is that what you want?

10 00 47 02 CMP No, I don't. It didn't even mention TVC here, but I'm sure - -

10 00 47 10 CDR ... D to A.

10 00 47 11 CMP - - that's how it works. Coarse align there. Can't do that. Can't do that, because it will affect the loads. Oh, wait. Yeah, we can try something like that.

10 00 47 31 CDR Are you sure we want to stay in this ..., Ken?

10 00 47 33 CMP Beg your pardon?

10 00 47 35 CDR Okay.

10 00 47 36 CMP Sure I want to stay in what?

10 00 47 37 CDR In CMC. Okay, it wasn't flying. It didn't before.

10 00 47 42 LMP Yeah.

10 00 47 44 CMP It's a transient condition now anyhow. Maybe it'll get untransient later on. Hank, looks like one other thing that would check the D-to-A's would be - How about if I load a - just a - a NOUN 22 of all zeros? And then call up a VERB 62?

10 00 48 05 CDR That would give you an attitude 202?

10 00 48 07 CMP Yeah.

10 00 48 09 CDR That ... what he said.

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10 00 48 14 CC ...

10 00 48 19 CMP Okay.

10 00 48 25 LMP You say it looks like D-to-A is working there, Ken? Or is it gone completely?

10 00 48 30 CMP I don't know.

10 00 48 32 CDR Nobody knows.

10 00 48 33 CMP I can't tell.

10 00 48 34 CDR Charlie, ... - -

10 00 48 36 CMP I can't think of how a D-to-A could have caused that red alarm the way it came up.

10 00 48 46 LMP Yeah.

10 00 48 47 CDR If it's in zero gravity, some kind of mechanical bit in there - something could be bouncing up against it, hit it, and then go back - -

10 00 48 54 LMP If it doesn't get it again.

10 00 48 55 CMP I'm more inclined to believe that we had a transient warning in the - in the warning circuit.

10 00 49 03 CDR Three of them?

10 00 49 05 CMP Yeah.

10 00 49 06 LMP I don't believe that.

10 00 49 07 CMP What's the difference if three - Whatever causes transients anywhere - -

10 00 49 10 LMP Yeah, ... - -

10 00 49 11 CMP - - why is it most likely in one circuit than another?

10 00 49 15 LMP It's not; I didn't mean that.

10 00 49 17 CMP You were just - -

10 00 49 18 LMP I just - -

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10 00 49 19 CDR If you had one and it never reoccurred, I'd agree, but we already had one - -

10 00 49 22 CMP No, it - it's a hardware thing that causes - -

10 00 49 24 CDR Is this what - is this what you had before?

10 00 49 26 CMP No. No.

10 00 49 28 CDR You're probably thinking we got something different than what you had then.

10 00 49 30 CMP Well, I'd be bored if I didn't.

10 00 49 33 CDR I'm bored already, and I'm ... - -

10 00 49 34 LMP Anybody got a Pentel or something?

10 00 49 35 CDR - - ... be back behind -

10 00 49 38 CMP (Laughter) ... Why, you want to use it to write on, or - -

10 00 49 40 LMP Yeah, I want to write on that I defecated at 200 and whatever it is.

10 00 49 46 CMP Hey, Mabel, when you transcribe the tape, will you record that, please?

10 00 49 52 LMP Yeah, I don't have a pencil, so will you tell the doc - -

10 00 49 55 CDR Here. (Laughter) That's a heck of a note.

10 00 49 56 LMP - - what belongs to me. (Laughter)

10 00 49 58 CMP Charlie?

10 00 49 59 LMP Yeah? Slide her this way.

10 00 50 00 CMP There you go.

10 00 50 01 LMP Oh, I got it. Thanks. (Laughter)

10 00 50 09 CMP I can't believe we - -

10 00 50 10 LMP You keep losing it.

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10 00 50 11 CMP - - the dingaling things we're doing on this mission. Oh.

10 00 50 25 CMP Was Henry on the night when I got - got all my transients? I'm gonna have that guy fired.

10 00 50 31 CDR Heart rate, about 80.

10 00 50 34 LMP Here you go, Ken.

10 00 50 35 CMP Yeah, but that was - that had nothing to do with the Exer-Genie.

10 00 50 39 CDR (Laughter) The Exer-Genie was your pacifier.

10 00 50 44 LMP Well, I believe you, Ken. If you say that you can make - you can make an entry without the G - G&N. The - the CMC looks good, though, huh?

10 00 50 52 CMP Yeah, it looks good.

10 00 50 54 LMP Good.

10 00 50 56 CMP But I'll tell you, at 6g's, when that thing comes up with an ISS warning light, even if you're planning for it, it's going to cause your pitty-pat to titter or whatever it does. We're gonna see - try Gemini-ing this time.

10 00 51 22 CMP Hank was on, with my gimbal that didn't work. Hank's on today. I don't think it was Hank that had the first night, though. That guy's gonna get fired. (Laughter)

10 00 51 40 CDR Got up to 90.

10 00 51 43 CMP I was in here exercising one day and the doc says, "All right, that's real good. You got your heart rate to 90." And I had just finished checking it, 72. (Laughter) Yeah, I wrote in the - I had just finished writing in the Flight Plan. I - I worked really hard, I thought, and I got it up to 72. And the doc says, "Hey, that's real good. You've - got a heart rate of 90." You dingdongs. That shows how crummy your gear is, anyhow. If he had 90 that day, he should have broken his cardiopack yesterday.

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10 00 52 20 CDR What happened yesterday?

10 00 52 24 CMP Every time Charlie would say how black it was, I'd look out there and my pitty-pat would be all rpm and no torque.

10 00 52 31 LMP Well, I guarantee you, it sure was black. (Laughter)

10 00 52 45 LMP That other one wasn't so bad, was it, you guys?

10 00 52 48 CDR That was one of your better ones, Charlie. (Laughter)

10 00 52 51 CMP Why couldn't you do those during dinner instead of the others?

10 00 52 55 LMP Well, I don't have ISS lights to get me excited (laughter). I been working on that all - -

10 00 53 00 CDR ... ISS light experience. Sure. We don't want you to - -

10 00 53 04 LMP I been work - I been working on that all morning.

10 00 53 07 CDR ... warning light stuff; we can't afford it. (Laughter)

10 00 53 22 CMP I ought to tell Hank. Never believe what Charlie did when the ISS warning light came on.

10 00 53 30 LMP Had a 17-second void. Why don't you log that - -

10 00 53 34 CMP Okay.

10 00 53 36 LMP - - along with it. Make it 18 seconds.

10 00 53 39 CMP Okay. (Laughter) An 18 seconder.

10 00 53 48 LMP Yeah.

10 00 53 49 CMP And the GET is something like 265:39.

10 00 54 06 CMP You is logged.

10 00 54 07 LMP Thanks. I can't believe it. It's worse than any sim.

10 00 54 17 CMP We sure have had our share of sim problems.

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10 00 54 20 CDR ... Good.

10 00 54 30 LMP Are we in the exercise period now?

10 00 54 31 CMP Yeah.

10 00 54 32 CDR What do you think I'm doing, Charlie? I fell behind when he gets an ISS light.

10 00 54 35 LMP (Laughter)

10 00 54 54 LMP Does the - does the D-to-A thing look like it's working, Ken? Or does it still have to pass that test?

10 00 55 00 CMP No. They - they don't want me to play and find out.

10 00 55 02 LMP Oh.

10 00 55 03 CDR That's right. You don't - -

10 00 55 05 CMP I'm gonna play just like I did on that sim, though. I'm gonna give them some time and if they don't come up with an answer, I'm gonna go find out.

10 00 55 12 CDR ..., you know.

10 00 55 15 CMP They can complain all they want to. That's the day I ain't running a training course for G&C.

10 00 55 38 CMP Quit hogging the exercise period, John.

10 00 55 39 CDR Well, ...

10 00 55 40 LMP How much have we got?

10 00 55 43 CMP We got another - Charlie's got to get his in there and I got to get in mine in there.

10 00 55 45 CDR One more pull and I'll give it to you.

10 00 55 48 CMP I was on - I was on about - I was working 10 minutes on my arms, 10 minutes on my legs, and then 10 minutes back on my arms again, and I - -

10 00 55 56 CC ...

10 00 55 57 CMP Go ahead.

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10 00 56 01 CC ... - -

10 00 56 16 CMP Who's got my pencil?

10 00 56 18 CC - - ...

10 00 56 28 CMP Okay. I have done this in the simulator and it - it did work, and we'll try this one in just a second. Okay, I'll need my pencil back, you thief.

10 00 56 38 LMP Okay.

10 00 56 40 CMP Okay. You want to set - you want to kill the DAP as the number 1 step.

10 00 56 46 CC ...

10 00 56 48 CDR Over here, where the ... is.

10 00 56 50 CMP Okay, and then you want to go back and go through step 12.

10 00 56 57 CC ...

10 00 56 59 CMP Okay, that's in work. I have 11101, 01111, okay. Zero. That's good. Just - just hit 1's.

10 00 57 22 CDR PRO?

10 00 57 23 CMP PRO.

10 00 57 24 CDR PRO. PRO.

10 00 57 28 CMP Okay, I have to do a VERB 46 on this. Now, that was one of the - the no-no's we had the other night. Is that okay?

10 00 57 40 CC ...

10 00 57 42 CMP Okay, just during EMP. Thank you.

10 00 58 13 LMP There it goes.

10 00 58 14 CMP Okay, and now that's working like a champ.

10 00 58 17 CDR Yeah, it works just like it's supposed to now.

10 00 58 23 CC ...

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10 00 58 27 CMP Okay, very good. I've done this thing in the CMS and I had the DAP on. There must be some other special condition where that -

10 00 58 48 CDR That says that D-to-A ain't it.

10 00 58 54 CMP Yeah. You can see, this - this ain't at all conclusive because this is all - -

10 00 58 58 CDR Okay.

10 00 58 59 CMP - - based on - this is all based on assumption up here, that you - that you couldn't get the lights off. We really had a transient condition.

10 00 59 07 CDR I know we did.

10 00 59 08 CMP So anything we find down here is only suggestive - -

10 00 59 10 CDR Okay. Okay, it's suggestive, but in the - in the final analysis - -

10 00 59 14 CC Ken, we'd like for you to activate the DAP again on a VERB 48, and 1 in digit A, and then a VERB 46.

10 00 59 26 LMP In the final analysis what, John?

10 00 59 28 CDR You can't tell visually whether the FDAI is - is reading and all that - you can't tell - you can't tell this right here by eyeball. You'd have to run - you'd have to run a P52 to tell that.

10 00 59 41 CMP That's right. I agree with you. Hank, we'd like to - I'd like to run a P52 here and see - see what kind of torquing angles we get. That will tell us whether or not we really been having any kind of a - of a hangup in the A-to-D section. As short as it was, we couldn't have gotten very far off in attitude.

10 01 00 07 CC Roger. We don't think it moved.

10 01 00 09 CMP Oh. Say again? We were in PTC at the time, so there was bound to be some rates going at the time. The fact that the VERB 40 didn't change anything shows that - -

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10 01 00 24 CC 16, Houston. Our SIM bay's gonna get too cold if we don't change attitudes. We'd like for you to roll to 280 degrees and then do the P52.

10 01 00 33 CMP Okay, I'll roll to 280. I'll do a - -

10 01 00 37 CDR The first thing you got to do is ...

10 01 00 39 CMP They're close.

10 01 00 45 LMP You through with your exerciser, John?

10 01 00 47 CDR Yeah, here.

10 01 00 48 CMP Okay, 280 is over here.

10 01 00 54 LMP I got it.

10 01 01 24 LMP Charlie, you're so strong.

10 01 01 27 CMP Who's giving the big sighs? You guys are huffing and puffing like it's on - -

10 01 01 30 LMP I just started.

10 01 01 31 CDR What are you supposed to do? You're supposed to put it on - -

10 01 01 33 CMP What - what did you set it on, though?

10 01 01 34 CDR I don't know. Whatever it took.

10 01 01 36 CMP (Laughter)

10 01 01 39 CDR Well, ... - -

10 01 01 40 CMP Is it up all the way?

10 01 01 42 LMP Well, I don't have no idea.

10 01 01 45 CDR Well, Charlie, if that's the thing that you were going to do - -

10 01 01 47 LMP How do you do it?

10 01 01 48 CDR Well, I did it like that, but I've never done it like you're doing it.

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10 01 01 52 CMP How'd you do it?

10 01 01 53 CDR ... both.

10 01 01 57 CMP I don't think it matters.

10 01 02 00 CDR Not if you don't care anymore.

10 01 02 06 LMP (Heavy breathing)

10 01 02 28 CDR Like if it was one of those 0.15-degree things.  
That's the only way you gonna tell, is do a - -

10 01 02 33 CMP 52.

10 01 02 34 CDR - - ... I - I forget how that thing is. I forget  
what the bits are in the CDUs, but they're like - -

10 01 02 39 CMP Plus 4 point - -

10 01 02 40 CDR - - 22-1/2 sticks in my mind, or 11-1/4, or  
plus 5-3/4. We sure didn't have 11-1/4 when we  
were - -

10 01 02 48 CMP Well, almost. The only one you could tell with  
the naked eye ... degree.

10 01 02 56 CMP (Heavy breathing) ... degrees in here.

10 01 02 57 CDR Yeah, ... if you can believe what kind of eight ball  
you got here.

10 01 03 02 CMP ... - -

10 01 03 03 CDR The spec value on the eight ball is ... - -

10 01 03 04 CMP Well, shoot, just 1.

10 01 03 05 CDR - - 210.

10 01 03 06 CMP One and one-half?

10 01 03 07 CDR Yeah.

10 01 03 08 LMP ... specs.

10 01 03 09 CMP We're doing a lot better than specs, aren't we?

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10 01 03 10 CDR Yeah.

10 01 03 11 CMP We think it's - I've been watching it, and it's just isn't off more than a degree.

10 01 03 18 CDR Yeah, that's one thing that hacked me about this whole business. Here we are flying a platform that's accurate to a hundredth of a degree, and we don't have a display to where we can tell it. You know?

10 01 03 31 CMP You need a vernier.

10 01 03 32 CDR You need - you need - you need fine displays if you're gonna fly something like this, and tell us beforehand.

10 01 03 36 CMP Yep.

10 01 03 38 CDR Same way we shut down the Saturn.

10 01 03 40 CMP ...

10 01 03 41 CDR ... could make it ... display where you could manually shut the mother off. ... Just put it on the - in there - little line knocked off, and say shut down. They chew your tail off if you say anything.

10 01 03 56 CMP Oh, yeah. Put it in there with - The thing was, when they built those things, they didn't have those kind of uses in mind.

10 01 04 02 CDR No, they had some stupid use in mind. You can bet on that. ...

10 01 04 06 CMP Hey! (Laughter)

10 01 04 08 CDR It's working, but we got to check it out. It comes up very shortly, I understand. Some time today.

10 01 04 13 CMP Yeah. Let's see what -

10 01 04 16 LMP What comes up very shortly? Check what out?

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10 01 04 26 CDR Houston, we just wanted you to know that the heart rates you're seeing or not seeing are due to the exercise period, not the ISS lights, although that could be a factor.

10 01 04 39 CC Roger. We copy.

10 01 04 48 CC The Surgeon, I think, had come to the conclusion you must be exercising.

10 01 04 58 CMP That's because he doesn't understand ISS lights.

10 01 05 03 CDR He just doesn't know what an ISS light will do to a boy.

10 01 05 08 CMP (Laughter)

10 01 05 18 CDR My PRD is floating.

10 01 05 20 LMP That's mine.

10 01 05 21 CDR ... want to defecate. Go down there.

10 01 05 30 CMP Yeah, if there's one kind of malfunction that I really don't like, it's these transient things. They keep you all keyed up -

10 01 05 37 CDR ... come on all day, you know? ... never see them again.

10 01 05 48 CMP Yeah, I know. That's what worries you most. That's that engine that burps then runs.

10 01 06 08 LMP Whew!

10 01 06 10 CDR Sweating, Charlie?

10 01 06 11 LMP Starting to get hot.

10 01 06 12 CDR Yeah, I start sweating; that's my problem. Had to quit because I ain't - we ain't got any room to sweat in here.

10 01 06 20 CC John, the Surgeon says your heart rate hit a peak of 114 during the exercise period.

10 01 06 27 CDR Well, I was timing it myself. Only got up to 100. You'd better check his ~~heart rate~~.

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10 01 06 39 CMP Your gear is a cardboard - probably a cardboard table with little tick marks in it. I can't believe, on that last LBNP test that they ran on our last physical, I ended up with a 30 - 38 heart rate laying on this table.

10 01 07 08 LMP Thirty-eight? Mine's never been - I think 48 was the lowest I've ever been.

10 01 07 13 CMP Bet I ain't been that low on this flight. I always thought it was probably - -

10 01 07 19 LMP I bet you that - I bet you when you were sleeping, it was that low.

10 01 07 22 CMP I wonder. Man, I tell you, every time I turn around I - I'm paying attention to - little battery compartment that reads 2.8.

10 01 07 41 LMP It does?

10 01 07 42 CMP Yeah. No, I'm sorry. 2.6. Excuse me.

10 01 07 45 LMP It's all my fault.

10 01 07 52 CDR I don't think they got that psyched out, really.

10 01 07 57 CMP They think that they do. You got to be careful of that one because that's the one that - We return that gear, and their analysis is subject to checking.

10 01 08 15 CDR (Laughter) You know, you'd be wrong about the gimbal motors ...

10 01 08 18 CMP Right. They'll have a very positive report about the gimbal motors. (Laughter)

10 01 08 27 CDR Yeah. There's always three answers to every question. One one guy knows, the one the other guy knows, and the one that's right.

10 01 08 42 CDR Charlie - -

10 01 08 43 CMP Why don't you whip off a 52, there, John?

10 01 08 46 CDR You want me to do it?

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10 01 08 47 CMP Sure.

10 01 08 49 CDR If anybody can do it, I can.

10 01 08 56 CC Ken, our pitch has got off a little bit. We need about 120 degrees in pitch also.

10 01 09 02 CMP Is that for a thermal reasons, Hank?

10 01 09 06 CC That's affirmative.

10 01 09 09 CMP You weenie. I don't believe that.

10 01 09 13 CDR Well, they got - I think I got data. I don't know that their thermal rationale is right.

10 01 09 22 CMP Okay, now it'll be a second here before I get to that attitude.

10 01 09 42 CDR Hey, you got you some stick time, Ken? ... Charlie.

10 01 09 57 CMP He'd be lucky if he can see anything through that telescope. I don't know. The Sun's at our back, so maybe he can.

10 01 10 04 CC Ken, you want to keep an eye on your roll.

10 01 10 07 CMP Well, how about telling me what attitude you precisely would like.

10 01 10 16 CC 280, 120, and 040.

10 01 10 21 CMP Okay; I can do that.

10 01 10 32 CDR Yeah, I see stars. Why don't you close up the - can you close up the ..., you guys?

10 01 10 36 CMP Yeah, I'll close up the hatch for you. I can't believe the difference in 280 and 284 means a hill of beans - in this big marshmallow.

10 01 11 22 CDR Well, I could see stars there for a while.

10 01 11 34 CMP Okay.

10 01 11 45 LMP Okay. Say when, Ken.

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10 01 11 47 CDR If you can take you some shots, well - let me use the DSKY here. It's a better reference. I'll probably go ahead and do it and then I'll probably get a better hack on the attitude here.

10 01 12 01 CDR We got two stars out there and I don't know what they could be.

10 01 12 06 CMP Probably Alpha and Beta Centauri.

10 01 12 09 CDR ... probably right. Is that where we're pointed now ...?

10 01 12 12 CMP Yeah.

10 01 12 14 CDR That's what they are. ...

10 01 12 19 CMP You don't have Atria next to it?

10 01 12 21 CDR No, I can't see it. Ken, let me do it. Okay?

10 01 12 25 CMP No, wait a minute, John. I - we'll use the DSKY.

10 01 13 26 CDR Okay, now I got all kind of stars up here. There's 1, 2, 3, 4, 5, 6, 7. I don't know what any of them are.

10 01 13 42 CDR ...

10 01 13 55 CDR Say when, Ken.

10 01 13 57 CMP I'll give you the program ..., John.

10 01 14 08 CMP He really didn't mean to just fly over to 280 roll.

10 01 14 12 CDR He really didn't mean to do that?

10 01 14 13 CMP No. He meant go to a specific attitude. He just didn't bother to say what it was.

10 01 14 18 LMP I thought he gave you 120.

10 01 14 19 CMP Yeah, after I asked for it. I could have gone there the first time just as easy.

10 01 14 27 CDR Oh, yeah.

10 01 14 29 CMP (Sneeze) Excuse me. (Sneeze)

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10 01 14 32 CDR ... and Beta Centauri?

10 01 14 34 CMP It is?

10 01 14 35 CDR Yeah, ...

10 01 14 38 CMP You can get Menkent ... All right. Now we're going to throw ourselves to attitude rate ATT RATE 2, LIMIT CYCLE, ON.

10 01 14 49 CDR ... sort of oriented - -

10 01 14 52 CMP ... power must be on.

10 01 14 55 CDR Are we - are we oriented up north?

10 01 14 58 CMP Towards the south.

10 01 14 59 CDR Towards the south.

10 01 15 09 CMP Okay, the first one is star 21.

10 01 15 12 CDR Star 21. Gonna have to go to ZERO OPTICS, Ken.

10 01 15 16 CMP Yep.

10 01 15 18 CDR ZERO to OFF. ...

10 01 15 22 CMP You'll have to turn the OPTICS power on before you're going to get anything.

10 01 15 24 CDR Okay.

10 01 15 25 CMP Turn the OPTICS power on first.

10 01 15 27 CDR Yeah; power on.

10 01 15 28 CMP Okay; now ZERO the OPTICS.

10 01 15 31 CDR They're ZEROed.

10 01 15 34 CMP You did it after the OPTICS power was turned on?

10 01 15 35 CDR No, before.

10 01 15 36 CMP No, you got to do it after. Because that's the only way the computer gets its discrete.

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10 01 15 48 CDR You go to OFF and then back to ZERO, right?

10 01 15 50 CMP Yeah. After the power's on. You have an SCS; you can go to MANUAL when the drive is finished. Whenever you feel like it, as a matter of fact.

10 01 16 05 CDR If I go to OFF, that program light hasn't been on ...

10 01 16 11 CMP Huh?

10 01 16 12 CDR That program light?

10 01 16 13 CMP What about it?

10 01 16 14 CDR ... was on. Do I go back to ZERO ...

10 01 16 18 CMP No, no - as long as you've been in there 15 seconds. And we'll just check it here.

10 01 16 32 CDR Okay, that's close enough.

10 01 16 37 CMP Okay, it's your computer.

10 01 16 42 CDR Twenty-one.

10 01 16 58 CDR Want me to do - try one?

10 01 16 59 CMP Yes, sir.

10 01 17 00 CDR Twenty-one -

10 01 17 01 CDR MARK, 21 is now marked. Okay, now I know where I'm at. Yeah, we're down to about - Okay, fine.

10 01 17 09 CMP (Laughter) I told you we were pointing south.

10 01 17 13 CDR I know you told me that, but I didn't see any stars out there.

10 01 18 00 CDR There you go. CMC. Spica.

10 01 18 09 CDR Phew! Boy, it's really getting bad, Ken.

10 01 18 16 CMP It's right in the - -

TIME SKIP

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10 03 10 39 SC (Whistling)

10 03 10 40 CC 16, Houston. You can check out the TV now.

10 03 10 45 LMP Okay. Thank you. With any luck, it'll break. Turn the monitor on.

10 03 10 52 CDR Monitor's on. That's not ... It's ... - -

10 03 10 59 CMP You don't have the power on yet.

10 03 11 01 LMP Yeah, I do. I got it in STANDBY.

10 03 11 03 CMP You got the TV switch on?

10 03 11 05 LMP Yeah. I got it to S-BAND AUX TV and to STANDBY. We ought to be getting a picture on the monitor.

10 03 11 12 CMP There it comes. I see us - -

10 03 11 13 LMP Takes a few seconds for it to warm up.

10 03 11 16 CDR What - what do you see on the monitor?

10 03 11 21 CMP Looks to me like -

10 03 11 24 CDR It's taking a nice picture of the wire.

10 03 11 29 LMP Okay, you got - let me have ... - -

10 03 11 30 CMP Why don't you let me get the brightness to bring on the monitor.

10 03 11 32 LMP Okay.

10 03 11 33 CMP I hope that's what it is. Maybe you need to stop down the aperture.

10 03 11 38 CDR Back on again.

10 03 11 40 LMP That's what it is. Yeah. I don't know.

10 03 11 47 CMP You want me to adjust it?

10 03 11 49 LMP The brightness is too ...

10 03 12 02 SC (Whistling)

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10 03 12 13 CDR Can you see this, Charlie? On the monitor?

10 03 12 19 LMP Oh. Yeah, you can see it.

10 03 12 22 CMP ... Oh, excuse me. I stepped on your tail.

10 03 12 27 CDR Didn't hurt it.

10 03 12 28 LMP Okay, Ken. Why don't you get in?

10 03 12 33 CDR Come on over here.

10 03 12 34 CMP I'm in the picture.

10 03 12 35 LMP No, you aren't. You just - your strut - the strut's in the way.

10 03 12 38 CMP Oh.

10 03 12 39 CDR See, that's the problem with it. To get three guys in the picture is really tough.

10 03 12 43 CMP I tell you what, I'll get in the tunnel and hang head down.

10 03 12 46 LMP That wouldn't be bad.

10 03 12 48 CDR It might work okay.

10 03 12 52 CMP I hope all the blood doesn't rush to my head.

10 03 12 54 CDR Yeah.

10 03 12 55 LMP That'd be a great picture, as a matter of fact.

10 03 13 04 LMP You think any - -

10 03 13 05 CMP Huh! I think this'll work.

10 03 13 06 LMP Yeah, it will. It's gonna be great. But you got to get up a little bit. There you go.

10 03 13 11 CMP Get which way? How should -

10 03 13 12 LMP Higher up that way so you got - -

10 03 13 13 CMP Higher up in the cone?

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10 03 13 14 LMP Yeah. Can you?

10 03 13 15 CMP Like that?

10 03 13 16 LMP Yeah, that's great.

10 03 13 17 CMP Oh, yeah, I see. I got my head up against John.

10 03 13 19 LMP That's too far.

10 03 13 20 CMP Okay?

10 03 13 21 LMP You see how you all think that looks.

10 03 13 27 CMP Well, that looks like a good picture. Wish I knew what it was.

10 03 13 32 CDR Get the wire out in front of the camera.

10 03 13 33 LMP It's the wire, yeah.

10 03 13 35 CMP Now what - Can you slide down some, John?

10 03 13 39 LMP Yeah.

10 03 13 40 CMP Let's see, maybe the - can you slide the - center the picture a little bit better?

10 03 13 43 LMP Yeah, why don't you all take the monitor over this way out of the - out of the field of view. Which way you want it to - -

10 03 13 47 CMP That's really gonna be a good picture, isn't it?

10 03 13 49 LMP Yeah, which way you want it to go?

10 03 13 50 CDR Yeah.

10 03 13 51 CMP Push the lens - up a little. Right there.

10 03 13 55 LMP Okay.

10 03 13 56 CMP How's that? Now, why don't you come get in the picture and see -

10 03 14 01 LMP Okay; let me tighten this thing down - -

10 03 14 02 CMP I think you - I think you -

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10 03 14 04 CDR I wouldn't even mess with it. It ain't gonna move.

10 03 14 06 LMP Okay. ... the old urine hose?

10 03 14 16 CMP (Laughter) Okay, I've - -

10 03 14 18 CDR Okay, now. Get the water ... down.

10 03 14 20 CMP I got to move the camera over - let's see if I can - -

10 03 14 24 CDR Just let Charlie slide over.

10 03 14 25 CMP Is that gonna be enough?

10 03 14 26 LMP Sure. There we go.

10 03 14 27 CMP Okay. (Laughter)

10 03 14 30 LMP There we go. We can put the monitor right here.

10 03 14 32 CDR Yeah.

10 03 14 33 LMP Yeah. Let me take - let me just take - -

10 03 14 34 CDR Maybe we all ought to slide down a little, and then - and then Ken can - -

10 03 14 37 LMP Yeah. There we go.

10 03 14 38 CDR Now you come down a little.

10 03 14 39 CMP I'm - I'm in good shape. This is comfortable here. I can stay here; I couldn't stay where I was. Can you read that from here? I'll pull my tail up. You can read it from that way.

10 03 14 50 CDR Is it - is it live TV?

10 03 14 51 CMP Yeah.

10 03 14 52 LMP No, it's not. It's not on - it is going to be, but it's not now.

10 03 14 54 CMP I got ... - -

10 03 14 55 CDR Then it will be - -

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10 03 14 56 LMP Yeah.

10 03 14 57 CDR - - in the future.

10 03 14 58 LMP I got to go to TRANSMIT.

10 03 14 59 CMP Okay. You want to get the tape out of there, and I'll tape it? Or how about if I just - -

10 03 15 04 CDR Tape what?

10 03 15 05 LMP Let me - I'll ... - -

10 03 15 06 CMP Here, here. How about this?

10 03 15 08 LMP Okay; wherever - wherever you can look at it. You know more about that than I do.

10 03 15 11 CMP Smell. It's ...

10 03 15 12 LMP Oh, that's the Velcro.

10 03 15 13 CMP Yeah.

10 03 15 14 LMP Wait a minute. Let me get un - unraveled a little bit - -

10 03 15 16 CMP Let me get some of this cord out of there.

10 03 15 17 LMP There we go.

10 03 15 20 CMP Let me get - Let's see. Yeah, there's what I need. Man, right up here on the ceiling. Now, get you a picture that's about oriented the way you see it. Can you see that?

10 03 15 37 LMP Yeah. Uh-huh.

10 03 15 40 CMP That's got too much torque in it.

10 03 15 43 LMP There; it's going to stay.

10 03 15 45 CMP Okay.

10 03 15 50 LMP Well, now what do we do? Tell them we're all ready to go - -

**CONFIDENTIAL**

Day 11

10 03 15 52 CMP Okay; right in the middle of this little exercise, the ISS warning light comes on.

10 03 15 57 CDR There will be a lot of ... there.

10 03 15 58 CMP Boy, that's more elbows than you've ever seen in one small screen.

10 03 16 04 LMP Tell them we're ready to go.

10 03 16 08 CDR Okay, Houston, we got the gear all checked out ready to go whenever you are.

10 03 16 16 CC ...

10 03 16 19 LMP We'll get down a little bit so Ken can ... - -

10 03 16 21 CMP Let's see, I wonder if that - -

10 03 16 22 CC ... we've got just under 8 minutes to go.

10 03 16 24 CMP Yeah. I believe that helps - or hurts.

10 03 16 28 LMP I think it helps to have it up.

10 03 16 29 CMP Turn it - have it up?

10 03 16 30 LMP Yeah.

10 03 16 31 CMP Yeah. I think you're right.

10 03 16 34 LMP You have any fixed ones over here that we could put on?

10 03 16 37 CMP Yeah.

10 03 16 38 LMP Okay, let me try that.

10 03 16 44 CMP That help?

10 03 16 45 CDR I couldn't see it ... on the picture, but - Yeah, I think - -

10 03 16 49 LMP Yeah, it did help.

10 03 16 50 CDR I think it did.

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10 03 16 51 LMP Yeah. Try not to hit the strut. Hey, that's going to be neat. First time anybody's ever hung upside down before.

10 03 17 04 CMP Can you read Mr. D. there, John? I can drop it on down ... - -

10 03 17 06 CDR Yeah. Oh, no; that's fine.

10 03 17 08 CMP Okay. Why don't you practice that, John?

10 03 17 11 CMP/LMP (Laughter)

10 03 17 12 CDR There's nothing so far removed from us so as to be beyond our reach nor - or so hidden that we cannot discover it.

10 03 17 30 CDR And here we sit - -

10 03 17 31 CMP ... minutes.

10 03 17 32 CDR - - testing his theories with what we been doing.

10 03 17 40 CMP Just a second.

10 03 17 41 LMP Excuse me.

10 03 17 47 CDR I'll just sit here the whole time scratching my rear.

10 03 17 50 LMP Oh, you ... (laughter).

10 03 17 52 CMP Adjust up your arm. Hey, wouldn't you know the TV studio turns out to be the head also.

10 03 18 02 LMP Phew! That urine is beginning to smell real good, isn't it?

10 03 18 05 CMP Oh, boy. You wonder, why would anyone build a spacecraft with everything located in the john?

10 03 18 12 CDR Where else could they put it?

10 03 18 16 CMP Well, I might get one more exercise period in tonight before I go to bed.

10 03 18 20 CDR I think that's a good idea.

10 03 18 21 LMP There you go.

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**CONFIDENTIAL**

Day 11

10 03 18 23 CDR ... we're going to snocker them on that bike tomorrow.

10 03 18 32 LMP I feel great. I really do, but I don't know how I feel - I'm going to feel when I hit the ground.

10 03 18 38 CMP I got a feeling that hitting the ground is going to be just like the adaptation of hitting orbit.

10 03 18 43 CDR Not the same.

10 03 18 44 CMP Like you felt like you'd always been there.

10 03 18 49 CDR Yeah.

10 03 18 50 LMP Now I didn't quite have that feeling (laughter).

10 03 19 02 LMP It's a great picture.

10 03 19 04 CMP Yeah; of course, the one that goes down isn't that good.

10 03 19 17 CDR ...

10 03 19 18 LMP Hey, Hank, do you have a list of questions? Are you going to be reading the questions up?

10 03 19 25 CC That's affirmative.

10 03 19 30 LMP Okay; thank you.

10 03 19 42 CDR Boy, ... I like to do that.

10 03 19 55 CMP Let's see, what time - Where's the Flight Plan?

10 03 19 58 LMP Right up there, Ken (yawn). It's supposed to be 268:10 or something like that.

10 03 20 04 CDR Yeah, we've got about 2 minutes to go. I can't see a clock.

10 03 20 07 CMP It's right over there.

10 03 20 08 LMP It's ... here - -

10 03 20 09 CMP It's 268:02.

10 03 20 10 LMP No, 08.

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10 03 20 12 CMP Oh, 06 here. Back in stable II again.

10 03 20 22 CMP Now it's back to ... We can forget about that.

10 03 20 34 CMP EMS entry check.

10 03 20 37 CDR (Yawn) Coming up?

10 03 20 39 CMP Yes, sir. And then we get ready for those Skylab contamination photos; we'll get those out of the way. And I'll do my weight measurements at the same time, just before we get to it. And then we go do some entry stowage. How does that sound?

10 03 20 57 CDR Sounds pretty good.

10 03 21 02 LMP Okay; there's two PPKs back there. I got one up here, and the rest of them - -

10 03 21 07 CDR We catalog all of that on the entry stowage.

10 03 21 10 CMP And there's a bunch in there?

10 03 21 12 LMP Oh, you do?

10 03 21 13 CMP Man, I tell you, there's more PPKs around this place than you can imagine.

10 03 21 24 CMP We have an eat period, then a rest period, and then we come out and we have 6 hours to entry.

10 03 21 49 CMP Well, I tell you that -

10 03 22 04 CDR Ohhh. You know what I ought to - As a precaution, I almost feel like pulse torquing that platform tomorrow.

10 03 22 13 LMP I sure would. How long does it take?

10 03 22 14 CDR I don't know ... though.

10 03 22 17 CMP Well, you got to go -

10 03 22 18 LMP 80 degrees -

10 03 22 19 CDR Yeah - -

10 03 22 20 LMP At least.

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10 03 22 21 CDR - - ... 80 degrees.

10 03 22 22 LMP At least.

10 03 22 23 CDR I don't know what the pitch has to do.

10 03 22 27 CMP It's going to be a - it could be a 12 - 14-minute torque, but the - -

10 03 22 34 LMP Well, we've got plenty of time. Four hours before entry. And you get another one on downstream.

10 03 22 52 CDR And we could - and we could maneuver the vehicle to ... the stars. I mean, there's no doubt in my mind what you ... see. You can recognize the patterns out here.

10 03 23 07 CMP Well, what I did the other night works like a champ.

10 03 23 10 CDR It sure does. Man, it worked like a champ. Sure a good way to do it.

10 03 23 15 CMP Yeah - -

10 03 23 16 CDR Let's do that.

10 03 23 17 CMP You never - you never get screwed up that way. You can't miss the Sun; you can't miss the Moon.

10 03 23 23 CDR Let's do that.

10 03 23 24 CMP Yeah. The accuracy you get was - well, enough to get auto optics to put the stars down. No, it's in the sextant.

10 03 23 31 CDR You still ... - -

10 03 23 32 CMP No sense in fooling around wasting time looking for - -

10 03 23 34 CDR Well, let's do - let's do that then.

10 03 23 36 LMP Do what?

10 03 23 38 CDR That.

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10 03 23 39 CMP The thing I'm worried about is if you coarse align, and it doesn't work, then what have you got?

10 03 23 45 CDR Well, let's align the SCS like we did before.

10 03 23 50 LMP Do it just like you've been doing except torque - except pulse torquing. Why don't you do that?

10 03 23 56 CMP That's awfully ... If you coarse align, and it doesn't work, I don't know what kind of a failure mode that leaves you in.

10 03 24 04 LMP Okay. They're about to come up. Why don't you give me the Flight Plan? (Yawn)

10 03 24 09 CMP I'll just stuff it up here.

10 03 24 11 LMP Okay.

10 03 24 16 CDR Let me get up about like this. That'll be half-way between you and Ken.

10 03 24 20 LMP Okay.

10 03 24 21 CDR ... Try and slide in there. There you go. That's good.

10 03 24 26 LMP I - I - -

10 03 24 27 CC 16, Houston. We're about ready to go here. You want to try to bring up the TV?

10 03 24 31 CDR Okay; it's in work. Going to TRANSMIT. Doesn't show. Okay. Then ... better go to TRANSMIT.

10 03 24 41 CMP Yeah. You know that's a way to get to the patch in there. If you just - if you just drive up towards that camera, Charlie, that one on your patch flows right up and looks great. That's a good way to end it.

10 03 24 53 LMP Okay.

10 03 24 55 CMP Once you reach over for the TRANSMIT switch, you just got to try to keep that - -

10 03 24 58 CC Okay. We've got a picture now.

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**CONFIDENTIAL**

Day 11

10 03 25 00 CMP - - patch centered on the -

10 03 25 03 LMP Super! How does it look?

10 03 25 08 CDR How does everything look to you?

10 03 25 09 CC Pretty good.

10 03 25 12 LMP Come down just a little bit, Ken. There you go.

10 03 25 15 CMP Which way is down? (Laughter)

10 03 25 16 LMP That - this way, towards me. That's good.

10 03 25 19 CMP Looks like I'm - you know - -

10 03 25 20 CC Other than the fact that you're looking pretty wooly now, that's not bad.

10 03 25 24 LMP (Laughter) Keeps you warm.

10 03 25 29 CMP Where did it go?

10 03 25 30 LMP It's going right towards the ...

10 03 25 31 CC Apollo 16, the questions in this press conference have been prepared by newsmen covering the flight here at the Manned Spacecraft Center. I'm going to read them to you exactly as worded by the newsmen and in a priority specified by them. Question number 1 for John Young: A couple of times you were on hot mike and didn't know it, but how could a nice Florida boy like you say what you did about citrus fruit?

10 03 25 58 SC (Laughter)

10 03 26 03 CDR That's a very good question. Wait until you drink it day and night for 2 weeks, and - and let me know what you think. And for lunch, too. I have - I have an orange grove - -

10 03 26 16 CC Question number 2 - -

10 03 26 20 CDR - - I have an orange grove down in Florida, too, so I do like citrus, but citrus drinks are something else.

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- 10 03 26 34 CC Question 2: When the CSM circularization burn could not be performed on schedule, did you think you wouldn't be able to land on the Moon?
- 10 03 26 47 CDR Yeah, I thought we all had serious doubts about whether we were going to be able to do it or not.
- 10 03 26 58 CC Question number 3 in three parts. Were you surprised at the rocks and other formations at the Cayley site?
- 10 03 27 08 LMP You want me to take that one?
- 10 03 27 09 CDR Yeah, try it, Charlie.
- 10 03 27 10 LMP I think we were. The - the original impression had been mostly volcanics to look for, and I don't think we've found the - the highest percentage of vol - volcanics as we had originally anticipated. So the rocks that we found were unique, that we'd never seen before in any of the lunar samples, we feel, and so it was a surprise.
- 10 03 27 41 CC Do you think your geological training properly prepared you to describe them?
- 10 03 27 50 CDR I think so, under the circumstances. You see, most of the rocks are - were dust covered apparently by the - by the - the two impacts, North Ray and South Ray. It had just thrown a big blanket of dust out across there, and we saw very few rocks that were clean un - until we cut into them. And you don't want to take too much time to stop and whack off a piece of rock, because that's pretty hard to do in a pressure suit. So we were just describing them more by shape and softness and friability and things like that. And that really doesn't take a lot of training, but I think we've had adequate training to do this kind of a job.
- 10 03 28 42 CC Did you see anything specifically volcanic?
- 10 03 28 50 CDR Tell them about the ...
- 10 03 28 51 LMP As far as craters go, Hank, we think we saw two that had the shape we called endogenic - that had the shape of very subdued old cinder cones or something of that nature. They were - In other words,

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they were - looked more like, well, sink holes, really, with the surrounding topography. They had no rim on them, and, to us, it looked like it might have been a source for some volcanic activity way, way back.

- 10 03 29 29 CC Question 4: Several times at North Ray you mentioned, "Don't get too close to the edge." Did you think that if you had fallen in, you wouldn't have been able to get out?
- 10 03 29 39 CDR That's affirmative.
- 10 03 29 41 LMP (Laughter) Yeah. You bet.
- 10 03 29 44 CDR If we had fallen in, we would not have been able to get out. That's correct.
- 10 03 29 52 CC Question 5: The heat flow experiment you broke was successfully fixed in simulation, although it was complicated and took a great deal of time. Do you think you should have tried to fix it or do what you did?
- 10 03 30 06 CDR I don't think we're qualified to make that decision. It was made by people on the ground that are far more qualified to do that sort of thing than we are. If - if we had been told to do that, we would have certainly done it.
- 10 03 30 25 CC Would you like to have been informed of the successful sinta - simulation and the trade-off factors involved?
- 10 03 30 31 CDR I - I still don't think that that's our decision-making process up there on the surface.
- 10 03 30 41 CC Question 6: You've had a lot of equipment trouble during this mission. Is there a common thread running through all these problems for which you could suggest an explanation?
- 10 03 30 52 CDR (Laughter) Why don't you take that one?
- 10 03 30 56 CMP Yeah. I think space flight's kind of complicated. You got a lot of sophisticated equipment here that you're trying to get all working at one time. I

**CONFIDENTIAL**

think that's what we built a redundancy in for, and it seems to be paying off quite well.

10 03 31 12 CDR

Yeah. I don't - I don't think there's any relation between any of these failures, one to another. I don't know. I don't think there's any common thread. I agree with Ken; it's very complicated gear. It has to run for long periods of time, and you've got to expect some times that it won't run, and you got to know how to fix it. And that's why they send us on these trips.

10 03 31 40 CC

Question 7 for Ken: Your observations of the landing site. Did you see the lunar module or the Rover, and did you see any differences between Cayley and Descartes?

10 03 31 51 CMP

Okay; that's - that's two distinct questions. First thing, did I see it? We never pointed the sextant at the landing site according to the Flight Plan because of the alterations we had. And there were two occasions, once when I thought I had caught a glint of light, which I could not recognize as the LM but which came from the location where I think the LM probably was sitting. And that was very close to the position on my map that you folks read up to me. And once, as the Rover was starting up on Stone Mountain, I just happened to be looking as they went by, and I think you were on the shift, Hank, and told me that they were hitting Stone Mountain. And I looked over there, and about that time I got another little flash of light, which is about all, with the 10-power optics we have, that - that I think you could expect to see. And at no time could you see something you could identify.

10 03 32 44 LMP

Probably was us.

10 03 32 48 CC

The second part of that question was: Did you see any differences between Cayley and Descartes?

10 03 32 54 CMP

Yes, I think there's a - distinctly different morphology involved in these two units. Our preflight training is a little different in impression than what I think I saw; and, again, we have, like I say, a 10-power resolution. I think the - the real

**CONFIDENTIAL**

Day 11

answer of what this material is, is going to lay in analyzing the data postflight. We have some good film records, and I think the - when you put that together with the rocks we picked up, we'll have a pretty powerful story that'll explain a lot of things we don't know now. But I think that there are sections of material we called Descartes, particularly the material that makes up Stone and Smoky, and that stuff runs all the way south down to the old Descartes Crater for which the region is named. And that does look texturally entirely different from the Cayley formation.

10 03 33 49 CC

Question number 8, again for Ken: What were your impressions of the back side of the Moon, and were there any surprises?

10 03 33 58 CMP

Well, the impression of the back side is something I tried to collect from the time we got there until the time we left. And I'm still mulling that over in my mind. I've got a lot of transcripts we're going to have to read before I can psych it all out. But, in general, the impression I have is that the material on the back side, when you look at it on as small a detail as I could look, looks to me like it's very much like the material we find on the front side surrounding most of the big craters. The thing that looks different is that the back side is devoid of these large basins. We don't have the large mares; there's very little mare. In fact, at the back side, the only mare we saw was really post-TEI, when we could look back and see a bigger area. But our groundtrack didn't pass over any mare in the daylight, so it took awhile to psych that out. But I think that was the major difference was the absence of these large basins. And, on the back side, did we see surprises? Well, we went up looking for - with a suspicion that we might find material similar to the Descartes formation located in several areas of the back side, and, indeed, I think we did. I think we saw an awful lot. I think we saw a lot that looks exactly like the Cayley. And I think the things that I saw that were - probably the most surprising thing was the - on the side of a crater called Guyot, which is just to the north and a little west of King Crater, which is right about the eastern limb of the

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Moon when you look at it from the Earth, we saw a big hole, I'll call it a crater, in the side of this - of the wall of this crater, and it appeared that there was material oozing out. And on our last couple of revs, we passed almost directly overhead, and it looked like it was filled with a pool of material, and this material had run down the side. And that's a formation typical of things you see like in Hawaii, something I had not seen anywhere else on the Moon, nor have I seen a picture of it.

10 03 36 04 CC Question number 9 for John and Charlie: At the tag end of EVA-3, you appeared to be having a high-jump competition. Who won, and how high do you think you jumped?

10 03 36 17 CDR (Laughter) No, no, we weren't having a competition. We were just showing you some of the things you could do with a 360-pound mass that only weighs 60 pounds, even slowed down, if you will, by the pressure suit. And I don't think anybody won; we were just demonstrating what you could do with the suit.

10 03 36 42 LMP ...

10 03 36 45 CDR I don't have any idea how we - -

10 03 36 46 CC Question 10 - -

10 03 36 47 CDR - - how high we jumped. You'll have to look at the TV. Maybe - maybe a foot or 2 feet.

10 03 36 56 LMP It was too high for me.

10 03 37 02 CMP They still get a picture?

10 03 37 03 CDR Ask them if they got a picture.

10 03 37 04 LMP You all got a picture, Hank?

10 03 37 05 CC Could you explain the circumstances surrounding the failure of the lunar module ascent stage to deorbit?

10 03 37 12 CMP (Laughter) A loaded one.

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10 03 37 16 LMP I think that has to be worked out when we've looked at all the data on the ground and discuss it with the flight controllers. At the present time, I have no idea.

10 03 37 29 CDR No, I don't either.

10 03 37 36 CMP Hank, could you verify that you still have a picture?

10 03 37 37 CC Question 11: To what extent - -

10 03 37 41 CMP We've lost our monitor, and just like to make sure there's nothing wrong with the camera.

10 03 37 47 CC We have a good picture.

10 03 37 48 CMP Thank you.

10 03 37 52 CC Question 11: To what extent did fatigue affect your performance? For example, do you feel that you would have been capable of a full 7-hour EVA-3, lift-off, and LM jettison all in the same day?

10 03 38 09 CDR I think that'd been pushing it a little.

10 03 38 12 CMP That's a bad question.

10 03 38 16 CDR We could have probably - -

10 03 38 17 CC .. - -

10 03 38 18 CDR We could probably have done it, but I think that'd really been pushing it.

10 03 38 27 CC Question 12 for each of you: What do you hope to tell your grandchildren as your most memorable moment of your trip to the Moon?

10 03 38 40 LMP Well, I'll start with that one, Hank. I had two impressions. The - the first is the dazzling beauty of Descartes - the surface. It was just one of the most awe-inspiring sights I've ever seen. And, secondly, on the EVA, when you look away from the Earth - or the Moon - it's just the utter blackness of space. It really is black out there.

10 03 39 13 CDR Time number 53 he's said that that. Go ahead, Ken.

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10 03 39 21 CMP

Thanks. Well, I guess I'm next then. I - I thought of - I knew someone would ask that question, and I've been asking that question, too. And I don't think I can put down an impression. There's so many that we've crammed in in the last 12 days. And it seems like each one comes on top of the other one, and the immediate response that you come up with is "That's the most fantastic thing I've ever seen." In - in a lot of respects, it really is. There - there have been so many events and so many sights that, in my case, I'm going to have to sit and think about this one for a long time before I could ever pick out one, and then I'm not sure I'll ever be able to say that there was a unique thing, or a most memorable event. The whole thing has been a - just one series of very impressive, and I hate to use the word, but I don't know anything else except to say, "It's fantastic."

10 03 40 11 CDR

I think Ken's got the answer. I think we've seen as much in - in 10 days as most people see in 10 lifetimes. And we certainly have enjoyed it.

10 03 40 27 CC

Question 13: From an astronaut's point of view, would you discuss the possible operation - operational difficulties, besides language, to be overcome in the proposed joint U.S./U.S.S.R. manned space flight? And would you have any suggestions to make?

10 03 40 56 CDR

(Laughter) From an astronaut's point of view, I'd - I would not feel qualified to discuss it, other than to say that if language is the problem, I'll be glad to learn Russian. I think Charlie and Ken feel the same way.

10 03 41 09 CC

Question 14: Did the potassium in your diet affect the taste of the food, and did it cause any other problems?

10 03 41 18 SC

(Laughter)

10 03 41 20 CDR

That's a very good question, and I - I'm not sure we're qualified to - to say. We'll have to get back and talk to everybody. I - I don't - I don't think it - I didn't notice it being in there as far as taste was concerned. And I don't think anybody else did.

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- 10 03 41 39 CMP No. Yeah. This is one of those things where you have to wait and take a look at - in our postflight medicals and see what they come up with as our body potassium level, because that's really the part that they're trying to work on, and I'm afraid the guys on the ground have a lot more data than we have on our physical condition, other than the fact that we know we feel good.
- 10 03 41 59 CDR Yeah. I think - I think we've been very fortunate to do as much of the mission as we have, considering - considering how much we got slowed down there. And I don't know whether potassium had anything to do with it or not, but if it did, I'm sure grateful that we were taking it.
- 10 03 42 25 CC Question 15 for John: What did you mean when you said morale went up a couple of hundred percent after that successful TEI? Was it low?
- 10 03 42 34 CMP (Laughter) Was your morale low before TEI?
- 10 03 42 40 CDR (Laughter) Yes - No, not particularly. It's just - it would sure be low if you didn't get off the TEI burn, I can tell you that.
- 10 03 42 52 CMP (Laughter)
- 10 03 42 57 CDR What can you say to a question like that?
- 10 03 42 59 CMP (Laughter) Yeah.
- 10 03 43 02 CC Question 16 for each of you: Based on your experience, do you have any recommendations right now for the crew of Apollo 17?
- 10 03 43 11 CDR Okay, I'll handle it. Yeah. I recommend they enjoy it as much as we did. I'm sure they will, because, I tell you, we really have - we really have had a lot of sights to see. I'll admit that, in a lot of cases, we worked hard, and - and I suppose the people on the ground were able to tell that. But we got all the support in the world from the MCC-Houston. I - I mean, I could tell, from every decision that came up from the ground, that - that there was a lot of work put into it. And all around the country that there were a lot of wheels

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turning and people working late hours and solving these problems. And I'm just really happy that Ken, Charlie, and myself got to do this. And I think it's a wonderful experience.

10 03 44 09 CC That was the last question, John. We thank you very much, and thank you for the kind comments.

10 03 44 12 CMP Why don't you read ... - -

10 03 44 13 LMP - - ... say the words?

10 03 44 14 CDR Okay.

10 03 44 15 CMP Why don't you say - -

10 03 44 16 CDR Well, let me just say one thing, Hank, and that is - Mr. Descartes said it. He said, "There's nothing so far removed from us as to be beyond our reach, or so hidden that we cannot discover it." And you all know that Descartes was the French mathematician and philosopher for whom the region was named. And I guess, really, the story of our mission so far is we've been out testing his theory. My personal assessment of where we are right now, as soon as we get the rocks back in the LRL, we'll be making headway toward proving he was right.

10 03 45 01 CC Good show, John.

10 03 45 04 LMP Okay. Hank, as the LEB sinks slowly into the distance - -

10 03 45 08 CMP Good show. Right on.

10 03 45 09 LMP - - we'll say good bye.

10 03 45 13 CMP Right on. Beautiful.

10 03 45 22 CDR Yeah, thank you.

10 03 45 24 LMP Well, it wasn't bad.

10 03 45 26 CDR Was your morale low before TEI?

10 03 45 28 SC (Laughter)



**CONFIDENTIAL**

10 03 45 29 CDR ...

10 03 45 31 CMP That was a good answer: it sure - it sure would have been if they hadn't. (Laughter)

10 03 45 36 CDR Oh, anyone who asks a question like that, there isn't an answer for.

10 03 45 40 CMP Yeah.

10 03 45 41 LMP Houston, 16.

10 03 45 45 CC Go ahead.

10 03 45 46 LMP Okay. Hank, do you want S-BAND AUX back to SCI?

10 03 45 52 CDR I knew - I knew those remarks about orange juice were going to come back to haunt me.

10 03 45 56 LMP Okay; you got it.

10 03 46 00 CMP Okay.

10 03 46 01 LMP Okay, we take the power off; the monitor's off.

10 03 46 03 CC Nice job there, guys.

10 03 46 07 CDR Thank you, sir.

10 03 46 24 LMP Was that the boss?

10 03 46 25 CDR Yeah.

10 03 46 33 LMP Okay. Camera coming down.

10 03 46 38 CMP Okay; I don't put it up then, if you don't mind, again.

10 03 46 41 LMP That sounds good.

10 03 46 45 CDR Put the Flight Plan back there.

10 03 46 46 CC ... give us ACCEPT, ... new state vector.

10 03 46 52 CDR Roger.

10 03 46 53 LMP They got it.

**CONFIDENTIAL**

10 03 46 54 CMP How come you're standing on your head?

10 03 46 56 CDR Stable II again, eh?

10 03 46 58 LMP Dang gummit.

10 03 47 02 CDR Yeah, you're right; it is stable II again.

10 03 47 04 LMP I don't remember you saying that, John, on hot mike.

10 03 47 07 CDR Oh, yeah. Oh, yeah!

10 03 47 08 CMP (Laughter)

10 03 47 09 CDR ... I was on hot mike quite a bit.

10 03 47 11 CMP It was on the - while we were sitting there coasting around waiting for a decision.

10 03 47 16 LMP Oh, yeah.

10 03 47 17 CMP And you were drinking the orange juice, and John said something about that, and I thought, "Oh, shoot, I hope that isn't hot mike." That's why - I think I called and asked you, and you said something about you were on hot mike to me but not to the ground.

10 03 47 28 LMP No. Most of the time, we were hot mike to the ground. We had DOWN VOICE BACKUP. Dadgum Fendell - BIOMED, OFF - He was trying to improve his circuit margin, so he was - -

10 03 47 37 CMP Here, I got to wad that up in a small ball, so -

10 03 47 40 LMP ... this?

10 03 47 41 CDR Yeah, I'll coil it when I get down there. I'll see how big the hole is. That is, if I can find my way down there. Gee, I'm turned around. Here I am going back up in the tunnel again.

10 03 47 58 CMP I may never get my equilibrium.

10 03 48 26 CDR I don't know if that was the fairest estimate or not. That's my feeling on it. I think - with the complete EVA and going through LM jett, would really be pushing it.

**CONFIDENTIAL**

10 03 48 35 CMP We - we ... did that.

10 03 48 36 LMP That's basically what we did.

10 03 48 38 CDR I know it.

10 03 48 40 CC Apollo 16, looks like we're getting some stratification in the H<sub>2</sub> tanks. Would you take the H<sub>2</sub> fans on for a minute and then back off again?

10 03 48 50 CMP Well, this is where the ... comes.

10 03 48 53 CDR I don't like the idea of doing any of those evolutions.

10 03 48 56 CMP I don't either.

10 03 48 57 CDR In a - in a 24-hour day. That's dumb.

## TIME SKIP

10 07 37 40 CDR Three filters.

10 07 37 42 CMP Yeah.

10 07 37 44 CDR Okay. And then it says, "The 70-millimeter mag, IM from, three in a bag." Transfer three in a bag. Okay, you got those, huh? Tape cassette kit.

10 07 37 56 CMP ...

10 07 37 58 LMP Do what?

10 07 37 59 CMP ...

10 07 38 01 LMP Where's that?

10 07 38 02 CMP It's in here ...

10 07 38 04 LMP Oh, yeah, yeah. Yeah, I know where that is.

10 07 38 07 CDR Most of this stuff that we need to stow is in F-1 and F-2, I think.

10 07 38 12 CMP ...

**CONFIDENTIAL**

~~CONFIDENTIAL~~

10 07 38 16 CDR Okay, we'll - -

10 07 38 18 CMP ...

10 07 38 19 CDR That's right. I think we're in a heap of trouble, myself (laughter).

10 07 38 23 LMP Why?

10 07 38 24 CDR Because I don't believe we're gonna make it through this list before reentry.

10 07 38 33 LMP Okay, here we go.

10 07 38 37 CMP ...

10 07 38 44 CDR No. It isn't listed in section I. The tape cassette kit.

10 07 38 52 CMP Got that.

10 07 38 53 CDR The tape recorder batteries, 11 in the bag?

10 07 38 55 CMP Okay, ...

10 07 38 58 LMP Okay.

10 07 39 00 CMP ...

10 07 39 03 LMP Yeah, they're not in there. We looked.

10 07 39 28 LMP Nothing in there but the 16s.

10 07 39 32 CMP ...

10 07 39 42 LMP Well, they aren't in here, Ken.

10 07 39 47 CMP ...

10 07 39 51 CDR What is it?

10 07 39 53 CMP Huh?

10 07 39 54 CDR What is it that rattles?

10 07 39 55 CMP ...

~~CONFIDENTIAL~~

**CONFIDENTIAL**

10 07 39 59 CDR Yeah, it's in - I saw that - it's in R - it's up there in the corner in R -

10 07 40 07 LMP Okay.

10 07 40 08 CDR That far one. Nah. Nah. Nah. That one with the - -

10 07 40 13 LMP Here you go.

10 07 40 14 CDR - - biostack in it.

10 07 40 15 CMP ... okay.

10 07 40 18 CDR And the next one is the inflight exerciser, and that's coming over to you.

10 07 40 22 CMP ...

10 07 40 24 CDR Yeah.

10 07 40 25 CMP That's the one?

10 07 40 26 CDR Yeah. That's what it says.

10 07 40 30 CMP ...

10 07 40 32 CDR Yeah. It's - it's on the way.

10 07 40 35 LMP Here you go.

10 07 40 49 CDR It says, "EMU maintenance kit."

10 07 40 50 CMP It's here.

10 07 40 51 CDR "Inflight exerciser," that's in there. "Water - H<sub>2</sub> gas separators, two in a bag."

10 07 40 57 CMP ...

10 07 41 00 CDR Okay.

10 07 41 01 CMP ...

10 07 41 15 CDR Okay. "Snag line in the bag with a strap," that's in there. "PGA interconnects, three in the bag."

10 07 42 01 CDR Oh, shoot.

**CONFIDENTIAL**

Day 11

~~CONFIDENTIAL~~

Page 521

10 07 42 23 IMP What are we looking for?  
10 07 42 26 CDR The interconnects. Three of them.  
10 07 42 36 CMP ...  
10 07 42 40 CDR Sure don't see them in here, Ken.  
10 07 42 53 CDR Here's the interconnect bag.  
10 07 42 55 CMP ...  
10 07 42 56 CDR Yeah.  
10 07 42 57 CMP ...  
10 07 42 59 CDR Well, I'll see.

TIME SKIP

10 07 54 18 CDR I don't know where that goes - section III, I guess.  
10 07 54 21 CMP Okay.  
10 07 54 22 CDR Okay. "Urine filter assembly, three in a bag."  
10 07 54 25 CMP ...  
10 07 54 28 CDR Well, I ain't gonna worry about our lousy filters. What difference does it make? They don't weigh 10 pounds. "Side of A-8 in a bag."  
10 07 54 38 CMP That's all in A-8?  
10 07 54 40 CDR That's it.  
10 07 54 41 CMP Okay. ...  
10 07 54 44 CDR Yeah. You know, they - they don't want anything in those things.  
10 07 54 47 CMP ...  
10 07 54 49 CDR "Side of A-8 in bag." Ah. "Vacuum hose - vacuum brush."

~~CONFIDENTIAL~~

**CONFIDENTIAL**

10 07 54 58 CMP ...

10 07 55 00 LMP Yeah.

10 07 55 02 CMP ...

10 07 55 05 LMP No, don't we have the vacuum hose?

10 07 55 16 CMP ...

10 07 55 23 CDR No, vacuum hose - vacuum brush, it says.

10 07 55 30 CMP ...

10 07 57 35 CDR "Urine hose with adapters and two straps."

10 07 57 40 CMP Side of A-8?

10 07 57 41 CDR Yes, sir.

10 07 57 42 LMP Okay. Here - here you go.

10 07 57 44 CDR "EVA guards; left, center, and right, with straps." They're in there. And the "Unipole - Unipod pole assembly" - -

10 07 57 49 LMP Wait a minute. Wait a minute.

10 07 57 50 CMP They're in. ... The unipoles are here. The guards are here.

10 07 58 03 CDR Okay. The vacuum brush is there?

10 07 58 07 CMP No. Jettisoned.

10 07 58 09 LMP We threw that away.

10 07 58 10 CDR Okay. Jettisoned with the LM.

10 07 58 23 CMP Okay. Now what?

10 07 58 25 CDR Okay, A-9 - "Lunar sample in bag."

10 07 58 34 CMP Nine - the samples in bag.

10 07 58 36 CDR "B-1, 3-inch mapping camera mag."

10 07 58 38 CMP Mag.

**CONFIDENTIAL**

Day 11

~~CONFIDENTIAL~~

Page 523

10 07 58 42 CDR B-2 -

10 07 58 43 CMP B-2?

10 07 58 46 CDR Yeah.

10 07 58 47 CMP The 35-millimeter camera?

10 07 58 48 CDR Yeah. You want to work - you want to work on - what do you want to work on? A-1?

10 07 58 53 CMP Yeah. I ... A-1 there ... I think ...

10 07 58 56 CDR Okay. A-1, "16-millimeter mags, seven in two bags."

10 07 59 09 LMP Here's three.

10 07 59 11 CMP Have you got some of those?

10 07 59 12 LMP I've got the cam - I got GG on the camera.

10 07 59 17 CMP Okay. I need LL.

10 07 59 19 CDR What do you need LL for? Okay, so we gonna miss one - one mag.

10 07 59 29 CMP Is that all?

10 07 59 30 CDR Yeah.

10 07 59 31 CMP ... Okay, I have - I have ... millimeter ...

10 07 59 44 CDR Okay. "70-millimeter mags, two" - -

10 07 59 52 CMP ...

10 07 59 57 CDR It's really bad.

10 08 00 19 CMP Okay. ...

10 08 00 32 CDR The what? Yeah. Wait a minute. I was just looking back to the Flight Plan to see what we're supposed to be doing right now - 272:46. ...

10 08 00 49 CMP ...

10 08 00 51 LMP Yeah. Houston, 16.

~~CONFIDENTIAL~~

**CONFIDENTIAL**

10 08 01 00 CC Go ahead, 16.

10 08 01 01 LMP Pete, we're busy with this entry stowage. Could you keep us on the Flight Plan if something comes up?

10 08 01 08 CC Okay. Will do.

10 08 01 09 LMP Thank you. Okay. Go ahead, John.

10 08 01 14 CDR There's - 16 millimeters.

10 08 01 18 LMP We got that.

10 08 01 20 CMP ...

10 08 01 21 CDR Okay. And then, "70-millimeter mags, two in the bag."

10 08 01 26 LMP I got one with three.

10 08 01 31 CDR There's two here.

10 08 01 33 LMP Take three, then. Well, ain't th - this is all of them. This is the last magazines we got out.

10 08 01 44 CMP ... three.

10 08 01 53 LMP You want these or not?

10 08 01 54 CMP Yes.

10 08 01 55 LMP Okay. Here you go.

10 08 02 05 CMP ...

10 08 02 10 CDR Yeah. Three. Okay, the "Interval timer."

10 08 02 24 LMP Where's that?

10 08 02 25 CDR Over there on your - Here it is, right here.

10 08 02 27 LMP Not any more, it's not.

10 08 02 29 CDR Here you go, Ken.

10 08 02 30 CMP ...

10 08 02 33 CDR What are we timing now?

**CONFIDENTIAL**

[REDACTED]

10 08 02 35 CMP ...

10 08 02 37 LMP Nah. I don't need it.

10 08 02 41 CDR The "Voice recorder."

10 08 02 47 LMP That's the tape recorder?

10 08 02 48 CDR Yeah.

10 08 02 49 LMP Let's see. That's up here in the -

10 08 02 51 CDR Here you are. I got it.

10 08 02 52 LMP Okay.

10 08 02 56 CDR "Remote control cable with - -

TIME SKIP

10 08 14 42 CMP ...

10 08 14 45 LMP That didn't come out of the LM.

10 08 14 50 CDR Maybe they're up in U - -

10 08 14 51 CMP ...

10 08 14 52 LMP That did.

10 08 14 53 CDR - - maybe they're up in U-2.

10 08 14 54 LMP No, they're down here, John. This other one right there, Ken. I think. Yeah. No, that's ours. No, wait a minute.

10 08 15 24 LMP Yeah, but I don't -

10 08 15 28 CMP ...

10 08 15 29 LMP No, huh-uh.

10 08 15 32 CMP Ones down here, I don't think are ...

10 08 15 34 LMP Weren't they - weren't these over there ...?

[REDACTED]

**CONFIDENTIAL**

10 08 15 37 CMP Some of them were.

10 08 15 38 LMP Yeah.

10 08 15 39 CMP ...

10 08 15 41 LMP Okay, the thing looks sort of like - this might be it right here. I don't think it really matters; a PPK is a PPK. The trouble is the guy who tied this tied it so dadgum tight.

10 08 16 04 CMP ...

10 08 16 06 CDR Yeah, why not.

10 08 16 16 LMP Okay, here's the flag kit.

10 08 16 18 CMP ...

10 08 16 19 LMP Okay. And here's a PPK, and how - can you get this - load this one of mine - this was a pocket item of mine - will that go in there? If not, I'll put it in my pocket. I'll leave it up here in R-2. Huh? Yeah, okay.

10 08 16 45 CDR Okay, you got 274, about, there, Pete.

10 08 16 50 CC Okay, John. Thank you.

10 08 16 56 CMP ...

10 08 17 01 LMP Okay.

10 08 17 02 CDR I - I'll get it, Charlie.

10 08 17 03 LMP "LM 16-millimeter camera." Here you go, and it's got bracket and everything. Lens - you want all that? It just says the camera.

10 08 17 16 CDR It just says, "LM 16-millimeter camera."

10 08 17 19 CMP ...

10 08 17 21 LMP Okay, that was up here in U - -

10 08 17 26 CDR Where was the LM - all that other stuff at? In one of the U's?

**CONFIDENTIAL**

Day 11

Page 527

10 08 17 35 LMP Yeah, it was in U-2 back here.

10 08 17 38 CDR Don't say nothing about the ...

10 08 17 42 LMP Here you go, Ken.

10 08 17 43 CDR Nothing in U-2 like that. That's where it was.

10 08 17 51 LMP I got it out. Okay, "Contamination and -  
contamination photo equipment."

10 08 17 59 CDR The DSEA - where is that? The DS - -

10 08 18 03 LMP It's in the ISA, I think, John. We'll just leave  
it there.

10 08 18 09 CDR Okay, so we've got the rest of this. Yeah.

10 08 18 15 LMP No, no, I'm doing that talking.

10 08 18 18 CDR On top of A-1 goes the lunar sample in decon bag.

10 08 18 22 CMP ...

10 08 18 23 CDR Yep. I'm sorry, you're through. I tell you, they  
don't want nothing in those lower compartments. I  
think they float the spacecraft or something, I  
don't know what.

10 08 18 49 CDR It doesn't even say which sample is in the decon  
bag, that's what gets me.

10 08 18 53 LMP It's the one - it's on the decon bag, John. It  
says stow on top of A-9. It's the -

10 08 18 57 CMP ... whole bunch of them ...

10 08 19 01 CDR A-7?

10 08 19 05 CMP ...

10 08 19 10 LMP ... Well, that wasn't what they said when I sent  
them across.

10 08 19 15 CMP ...

10 08 19 20 CDR Which way?

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**CONFIDENTIAL**

10 08 19 21 CMP Plus-Y.

10 08 19 22 CDR Plus-Y.

10 08 19 25 CMP ... Okay, ... out.

10 08 19 30 CDR What is that?

10 08 19 37 CMP ...

10 08 19 41 CDR I think that goes somewhere like A-9 or something.

10 08 19 55 CMP ... this thing ...

10 08 19 58 CDR What's that?

10 08 20 00 CMP ... bag ... middle of the floor ...

10 08 20 16 LMP There's one up here you can reach, Ken.

10 08 20 18 CMP Huh?

10 08 20 19 LMP Here's one right here you can reach.

10 08 20 20 CMP ...

10 08 20 21 LMP Yeah.

10 08 20 22 CMP ... bag ...

10 08 20 27 LMP Yeah, I know it. This one barely - barely sticks out. Well, I can hook it on the side - I can hook it on the side - there - there we go.

10 08 21 12 LMP I'll get it loose. Okay. Huh? Oh, excuse me. I thought you meant you had the wrong bag. Okay.

10 08 22 44 LMP Ken, those two PPKs you took out of A-7 - can we put these two that were in U-1 back in there? The ones that were in U-1.

10 08 22 53 CMP ... I don't know, Charlie, ... I wouldn't think so.

10 08 22 57 LMP Okay.

10 08 22 58 CMP Want to put them down here before I close this up?

10 08 23 01 LMP Do you have room in A-7 - I mean in A-1 for these?

**CONFIDENTIAL**

Day 11

~~CONFIDENTIAL~~

Page 529

10 08 23 05 CMP ...

10 08 23 06 LMP Oh, that's okay, we'll just leave them in U-1.

10 08 23 09 CMP ...

10 08 23 11 LMP Yeah.

10 08 23 12 CMP ...

10 08 23 13 CDR That's right, that's ...

10 08 23 40 CMP ...?

10 08 23 45 CDR I sure didn't see you. You want a flashlight, Ken?

10 08 23 50 CMP ...

10 08 23 52 CDR Do you want to see it, in other words.

10 08 23 55 CMP ...

10 08 23 57 CDR Shine in your face.

10 08 24 00 CMP ...

10 08 24 04 CDR I can't think of any.

10 08 24 05 CMP ...

10 08 24 08 CDR No.

10 08 24 09 LMP I'm gonna take this cabin fan filter off, okay?

10 08 24 12 CDR I'll just pull it reasonably tight.

10 08 24 15 LMP Is that okay, you guys?

10 08 24 20 CMP ..., Charlie, ...

10 08 24 22 LMP Okay. Well, I was just trying to help. It should be stowed in U-2.

10 08 24 26 CMP ..., got a bag to put it in ... take it down ...

10 08 24 32 LMP I have a bag right here.

10 08 24 33 CMP Oh, okay. All right.

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**CONFIDENTIAL**

10 08 25 38 CMP ...

10 08 25 44 CDR Okay. Want to go up to - what do you want to start on next? A-2? Okay. "PPK, two, and flag kit, one."

10 08 26 08 CMP ...

10 08 26 17 CDR Two of them and a flag kit.

10 08 26 19 CMP ...

10 08 26 21 CDR That's what it says. It's been written in here.

10 08 26 28 LMP This ORDEAL, where does it stow, John? It goes down on the bottom, it doesn't go in U-1 ...

10 08 26 33 CMP ...

10 08 26 35 CDR Yeah.

10 08 26 36 CMP ...

10 08 26 38 CDR The FCS.

10 08 26 42 CMP ...

10 08 26 43 CDR Okay. That's trash. That's in the trash bag?

10 08 26 52 CMP Yeah.

10 08 26 54 CDR "Tissue dispenser, four."

10 08 26 56 CMP ...

10 08 27 00 CDR Okay. Tiedown rope bag?

10 08 27 16 LMP It's in the cockpit up here. Don't we want to leave that out?

10 08 27 23 CMP ...

10 08 27 25 CDR Yeah. The heel restraint bag?

10 08 27 32 CMP ...

10 08 27 34 CDR Okay. PPK, two, and flag kit, one, is all that is left.

**CONFIDENTIAL**

10 08 27 40 CMP ...

10 08 27 42 CDR Okay.

10 08 27 43 CMP ...

10 08 27 47 CDR Okay; ISA on top of A-2. ISA and decon bag.

10 08 28 17 CMP ...

10 08 28 19 CDR Yeah, I believe it is one of the biggest.

10 08 28 24 CMP ...

10 08 28 27 CDR It says - it should say on there, doesn't it?

10 08 28 30 CMP ...

10 08 28 33 CDR Well, Ken, it always did back in the old days, I -

10 08 28 37 LMP It doesn't say - no - it didn't - Well, we went through that the other night. It ain't worth it again.

10 08 29 19 LMP Oh, you - John?

10 08 29 20 CDR Huh?

10 08 29 21 LMP Put your seat pin up.

10 08 29 23 CDR Sure.

10 08 30 32 CDR I was reading those others ... - -

10 08 30 34 LMP Yeah, okay.

10 08 30 35 CDR - - ... Darn thing. I got it out like nothing's business and it isn't going back in. Yeah.

10 08 30 50 CMP ...

10 08 30 55 CDR Well, it looks like it, because the connector fits in there. Other than that, it wouldn't fit.

10 08 31 02 CMP ...

10 08 31 08 CDR Yeah, I think the face is up in the - the face is up in the - -

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10 08 31 27 CDR ... hold this right there.

10 08 32 38 CMP ...

10 08 32 45 LMP Okay. Now it says "Front" - that's all of A-2. It says, "Front of A-3 - A-6, core stem in bag." And we'll leave it where it is.

10 08 32 53 CMP A-3?

10 08 32 54 LMP A-6.

10 08 32 58 CMP What's in there?

10 08 32 59 LMP Core stem in bag.

10 08 33 01 CMP ...

10 08 33 02 LMP Yeah.

10 08 33 21 CMP ...

10 08 33 24 LMP What?

10 08 33 25 CMP ...

10 08 33 27 LMP Oh, yeah. There you go.

10 08 33 46 CDR As soon as I figure out what is keeping it from going in there, I'll get it.

10 08 34 31 CDR I'm just wasting my time. I can't get it. I don't know how you can get in there and do it. I'll tell you what. I'm going off comm. Charlie, watch the store and I'll get it. It makes me mad.

10 08 34 51 CMP ...

10 08 34 56 CDR That's a - I can't tell what it's doing. I'm looking at it - -

10 08 34 59 CMP Well, I ...

10 08 35 01 CDR Yeah, I guess you better, I can't get the -

10 08 35 05 CMP ...

10 08 35 10 CDR What do you want me to put in the suit bag?  
(Laughter) Oh, shoot.

~~CONFIDENTIAL~~

10 08 35 22 LMP Hey, John, here. You hold the store and I'll get the thing back there. Oops, excuse me. Everywhere we look there's tissues everywhere. But when you want to - when you want one, you can't find it.

10 08 35 50 CMP ...

10 08 35 52 CDR No, you never would. I ain't sure you'll do it in zero g, either.

10 08 36 30 LMP Okay, that's in.

10 08 36 51 LMP You gonna leave those core stems where they are, Ken, or bring them over here?

10 08 36 54 CMP ...

10 08 36 57 LMP Okay. I thought that seemed like a pretty good spot to me.

10 08 37 05 CMP Yeah, ...

10 08 37 08 CDR This goes in the PGA bag, Charlie.

10 08 37 11 LMP What?

10 08 37 16 CDR How's it coming?

10 08 37 17 LMP This goes in the PGA bag?

10 08 37 18 CDR What was it you wanted to put in the PGA bag?

10 08 37 21 LMP I've already got it.

10 08 37 22 CDR Oh, okay. What do you think?

10 08 37 32 CMP ...

10 08 38 04 CDR You got it. Beautiful. ... never get it out.

10 08 38 13 CMP ...

10 08 38 22 LMP You know, Ken, the core stems go right here but how - I don't know how they tie down.

10 08 38 29 CMP I think you strap them.

**CONFIDENTIAL**

10 08 38 30 LMP Yeah.

10 08 38 31 CMP ...

10 08 38 34 LMP Oh, that's the way they do it, yeah. Man, is this thing filthy.

10 08 38 55 CMP ...

10 08 38 57 LMP I don't know. Let's see, maybe if we did it this way. Oh, that's the way you do it, I bet you. Take the straps this way like this - like this? And then snap it to the top here, because it'll - it'll fit then.

10 08 39 18 CMP ...

10 08 39 20 LMP You can't hack it up there? Those are - they're really bad. Let's see - Wrap it around once like this one. Take it around - there you go. Now. There you go. Okay, that ought to be it, yeah. Yeah, I don't think this is gonna quite hack it. Why don't we just leave that one? Make this -

10 08 40 06 LMP No.

10 08 40 14 CMP Okay, John.

10 08 40 16 CDR Okay, what do you want to work on next? Top of A-2 says, "ISA decon bag." De - ISA decon bag, you got that?

10 08 40 26 CMP ... here. Yeah, yeah, yeah. ..., yeah. ...

10 08 40 29 CC 16, we think we may have stratification in H<sub>2</sub> tanks 1 and 2. Would you give us about 1 minute on the fans?

10 08 40 35 CDR Roger. H<sub>2</sub> tanks 1 and 2; 1 minute on the fans.

10 08 40 40 LMP They said that this morning. One, 2.

10 08 40 47 CDR Okay, it says, "In front of A-3 and A-6, core stem in bag."

10 08 40 51 LMP We got it.

**CONFIDENTIAL**

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10 08 40 53 CDR Got it?

10 08 40 54 LMP Yeah.

10 08 40 55 CDR It says, "Fire extinguisher on the side of A-3."

10 08 40 57 CMP Yeah.

10 08 40 58 CDR "CO<sub>2</sub> absorbers, four, in A-3. CO<sub>2</sub> absorbers, four, in A-4. CO<sub>2</sub> absorbers, four, in A-5. A-6, urine bags, three, with overwraps. Retention straps, two; vacuum cleaner, side of A-6. Rock bags, two" - That's no, we put those rock bags -

10 08 41 18 CMP ...

10 08 41 22 LMP It'd have to be.

10 08 41 26 CDR It's in A-6? What kind of rock bag is it?

10 08 41 41 CMP ...

10 08 41 44 CDR There ain't no rock bags in it? Those - weren't those the padded samples, Charlie?

10 08 41 51 LMP Oh, yeah, those were in the - yeah, that's right, those are in the ISA.

10 08 41 56 CDR Pardon?

10 08 41 57 LMP They are in one of the other collection bags.

10 08 41 59 CDR Samples in other bag, right? Okay, it says, "Dosimeter taped to bottom" - of something.

10 08 42 11 CMP ...

10 08 42 13 CDR Yeah.

10 08 42 15 CMP ...

10 08 42 16 CDR I don't know.

10 08 42 22 LMP What does it say? You have it written in, Ken; "Dosimeter taped to bottom."

~~CONFIDENTIAL~~

**CONFIDENTIAL**

10 08 42 27 CDR No, I don't think Ken wrote this thing. Don't worry about the dosimeter.

10 08 42 31 CMP ...

10 08 42 33 CDR I don't know where it is. It says, "Rock bags" - there are no dosimeters on those rocks.

10 08 42 51 CMP ... want that.

10 08 42 55 CDR Yeah.

10 08 43 01 LMP I don't know what that means. I wouldn't worry about it.

10 08 43 07 CDR Okay, me, too. "Fecal collection assembly in bag, 18, three Skylab in A-7."

10 08 43 22 CMP ...

10 08 43 24 CDR That's what they say.

10 08 43 26 CMP ...

10 08 43 29 CDR Okay.

10 08 43 30 LMP There's this one to jettison to the LM, Ken, I put up here in U-1 - to replace the LCGs.

10 08 43 37 CMP ...

10 08 43 39 LMP Yeah, uh-huh.

10 08 43 42 CDR Okay, the OPS. "Vacuum cleaner decon bag, vacuum bag, vacuum cleaner power cables."

10 08 43 49 LMP Vacuum bag went in the LM.

10 08 43 59 LMP Vacuum cleaner ...

10 08 44 00 CMP (Laughter) ...

10 08 44 01 LMP Oh, it is?

10 08 44 04 CMP ...

10 08 44 05 LMP Oh, yeah.

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10 08 44 10 CDR Vacuum cleaner power cable.

10 08 44 12 LMP You want to stow that, Ken? With the food in it?

10 08 44 18 CMP Well, ...

10 08 44 40 CMP ...

10 08 44 51 CDR What's the matter?

10 08 44 52 LMP He's urinating

10 08 44 55 CDR Oh. Shoot, Ken.

10 08 44 57 CC 16, we noticed the cabin pressure drop about a tenth and the O<sub>2</sub> flow go up a little bit. Are you doing something that might have caused that?

10 08 45 09 LMP Negative. Sure not.

10 08 45 11 CDR We were just laying here.

10 08 45 16 CC Okay. And also we have a maneuver for you. We'd like you to do the VERB 49 maneuver to the X-ray pointing thermal attitude Cyg X-1. It's at 273:15 in your Flight Plan, but I'll read you the angles, if you want.

10 08 45 32 CDR Appreciate it.

10 08 45 35 LMP Check off - -

10 08 45 36 CC ... it's 278, 295, and 310.

10 08 45 43 LMP They noticed the cabin go down about a tenth and the O<sub>2</sub> flow come up, and they was wondering if we were doing anything.

10 08 45 48 CC ... HIGH-GAIN angles are PITCH, 11; and YAW, 330.

10 08 45 56 CDR Roger. PITCH, 11; YAW, 330; attitude 278, 295, and 310.

10 08 46 06 CC That's affirmative.

10 08 46 07 CDR Okay. We're going there now.

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Day 11

10 08 46 13 CC Okay. And we're watching the cabin pressure. It's steady again now.

10 08 46 19 LMP Okay, Pete. It looks about like where it's been to us. We think it's been hanging a little bit below 5.

10 08 46 32 CC Yeah. That's affirmative, and EECOM says that could be the cabin regs making up that's causing what he's seeing.

10 08 46 39 LMP Okay.

10 08 46 44 CMP ...

10 08 46 47 LMP I think it's doing it now, Ken.

10 08 46 49 CMP ... making up ...

10 08 46 51 LMP Yeah.

10 08 46 54 CDR Yeah, I think while we had that hole open, we saw no increase in O<sub>2</sub> flow and we thought it was very strange at the time. There was no increase at all, and maybe now the cabin regs decided to make it up a little.

10 08 47 12 CMP ...

10 08 47 19 CDR You want some more, Ken?

10 08 47 21 CMP ...

10 08 47 22 CDR Some more ... to - to pack.

10 08 47 24 CMP ...

10 08 47 27 CDR I know. I got to tinkle, too. (Laughter) Bad.

10 08 47 48 LMP ... 7 ... is what I'm telling you. Okay.

10 08 48 00 CDR A-7 is a bad compartment to get into.

10 08 48 03 LMP ...

10 08 48 04 CDR Okay, it says, "E - E - vacuum cleaner power cable."

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10 08 48 10 SC ...

10 08 48 17 CDR Man, I sure don't either, come to think of it.

10 08 48 19 SC ... Yeah.

10 08 48 32 SC You think this is it?

10 08 48 36 SC Yeah, ...

10 08 48 39 CDR I think that's where we put it, as a matter of fact.

10 08 48 42 SC ...

10 08 48 46 CDR That's where we put it. Okay. Let me continue.

10 08 48 52 LMP ... finish up.

10 08 48 54 CDR Okay. EVA - EVA equipment container.

10 08 49 02 CMP Go ahead.

10 08 49 03 CDR Pressure control valve.

10 08 49 05 CMP All that equipment ...

10 08 49 06 LMP All that's there.

10 08 49 08 CDR And it's in A-7, right?

10 08 49 09 CMP Yep.

10 08 49 10 CDR We already checked that yesterday. EV gloves and wrist tether in accessory bag - for the CMP is in there, right?

10 08 49 17 CMP ... one ...

10 08 49 22 CDR Where are they going to go?

10 08 49 24 CMP ... tunnel.

10 08 49 27 LMP They're up in the tunnel, I think, Ken.

10 08 49 53 LMP You want to put this up there, John? Let's turn it around.

10 08 50 00 CMP ...

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10 08 50 02 LMP That's the wrong one. I should have known.

10 08 50 07 CDR Okay, Houston. You want us to dump the OPS again? We're - would like to finally stow it, and we can dump it now if you want.

10 08 50 17 CC Okay. We would like to use the OPS to get the cabin up to 5.6, and then leave it in bleed flow through the sleep eperiod.

10 08 50 24 LMP 0 - okay. Dump the OPS, Ken, up to - to get the cabin up to 5.6 and then leave it in bleed flow.

10 08 50 35 CDR Whatever that means.

10 08 50 37 LMP I don't know how you do that.

10 08 50 39 CMP ...

10 08 50 41 CDR I would think.

10 08 50 44 LMP Yeah.

10 08 50 46 CDR I don't know. I think that's how it is. That bleed flow means leaving the - the hose in the port and leave it on, right?

10 08 51 01 CC Stand by a minute, John. I'll check.

10 08 51 23 LMP ...

10 08 51 41 CDR How much is in there, Ken?

10 08 51 43 CMP ... on the ...

10 08 51 44 CC 16, we need you to check that dump in the hatch where you just made the Skylab dump from. We're still showing a little high on the O<sub>2</sub> flow.

10 08 51 54 CDR Well, we checked it. It's all closed.

10 08 51 59 LMP Flow just went to 0.2 here, Pete.

10 08 52 04 CC Yeah. Roger. EECOM's just calling it. We're seeing it drop off here now.

10 08 52 09 CDR Dingalings.

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10 08 52 17 LMP That sure looks tight. I guess I could switch to ...

10 08 52 21 CC Okay. On the OPS configuration, we wanted the OPS connector locked in the stowage plate and turn the OPS ACTUATOR to ON. ...

10 08 52 30 CDR I understand.

10 08 52 31 LMP It is 5.2.

10 08 52 33 CC ... the cabin up.

10 08 52 35 CDR Okay. Okay. That's what we'll do.

10 08 53 31 IMP How did I get so tangled up here?

10 08 53 34 CDR Charlie, how did you get so tangled up there?  
(Laughter) 5 - 5.3, Ken. I don't think it's going to get up there. What's - what's on the - what's - -

10 08 53 47 CMP ...

10 08 53 50 CDR Well, that's what they said.

10 08 53 52 LMP No, they didn't say that. They said they had it - -

10 08 53 55 CDR They said they wanted us to check and make sure we closed the port. Not only did he close it, he sealed it with a kiss. Right?

10 08 54 15 IMP If that's all the leak is, we got it made.

10 08 54 18 CDR Right.

10 08 54 20 CC 16, on the HIGH GAIN, I think the angles we called up are wrong. Let's go PITCH, 55; YAW, 323.

10 08 54 30 CDR Did you get those angles?

10 08 54 31 IMP Yeah, I got them.

10 08 54 42 CDR Okay. We're at the Sco X-1 attitude, as you know.

10 08 54 50 CC Roger. And go WIDE on the HIGH GAIN.

10 08 55 04 IMP Pete, it doesn't seem to be acquiring in REACQ, and I stepped it through.

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10 08 55 15 CC Okay. And, Charlie, did you copy to try 55 degrees on PITCH and 323 on YAW? And the first set of angles we called up were not correct.

10 08 55 24 LMP Okay. My mistake.

10 08 55 51 CC No, Charlie. That was our mistake. The first set of angles we called up were wrong.

10 08 55 55 LMP Okay; 55 and 323.

10 08 55 59 CC Affirmative.

10 08 56 00 CMP ... put it on the eight ball and ... let it ...

10 08 56 09 CDR Okay. That's reading to - -

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## DAY 12

11 01 08 48 LMP - - SET. Tape is running. Standing by for 289:58, Separation Checklist.

11 01 09 57 CMP Think they've slipped.

11 01 10 20 CMP Okay, they've given us this. Is there any reason why we shouldn't -

11 01 10 23 CDR Houston, have you got the PIPA incorporated?

11 01 10 26 CMP Yeah.

11 01 10 28 CC ... affirmative.

11 01 10 30 CDR Okay, we're going to BLOCK.

11 01 10 31 CMP It is BLOCK.

11 01 10 33 CDR Okay. Well, let's go.

11 01 10 39 LMP Okay, we're a few minutes out. CB ELS/CM-SM SEP, two, close.

11 01 10 44 CDR Circuit breaker.

11 01 10 45 CMP Yeah. That's CM-SM SEP, one, two, closed.

11 01 10 48 LMP PRIMARY GLYCOL TO RAD, BYPASS, PULL.

11 01 10 53 CMP Want to do this early? We're about a minute ...

11 01 10 55 LMP We're about a minute up.

11 01 10 57 CDR ... glycol.

11 01 10 58 CMP BYPASS is pulled. Okay, now.

11 01 11 01 LMP REPRESS PACKAGE, FILL, to 865. It already is; I just checked it. Then ON.

11 01 11 06 CMP REPRESS PACKAGE you want ON.

11 01 11 08 LMP Yeah.

11 01 11 09 CMP Okay. Okay, it's ON.

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11 01 11 12 LMP O<sub>2</sub> SERVICE MODULE SUPPLY valve, OFF.

11 01 11 15 CMP SERVICE MODULE SUPPLY is OFF.

11 01 11 16 LMP SURGE TANK, ON; verify.

11 01 11 18 CMP SURGE TANK is ON.

11 01 11 19 LMP CABIN PRESSURE RELIEF valve, two, to NORMAL.

11 01 11 25 CMP Two, NORMAL; okay.

11 01 11 27 LMP ABORT SYSTEM PROPELLANT, RCS COMMAND; verify.

11 01 11 30 CMP Yep.

11 01 11 31 LMP SERVICE MODULE RCS SECONDARY PROPELLANT FUEL PRESSURE, four, OPEN.

11 01 11 36 CDR Yeah.

11 01 11 37 LMP Verify that.

11 01 11 38 CDR SECONDARY ...

11 01 11 40 LMP VHF AM A and B going off. Okay, Hank, your VHF is off. I'm turning off the fuel pumps now. HIGH GAIN ANTENNA POWER is coming OFF. FUEL CELL PUMPS, three, OFF. Gonna get some MAs here, probably, in a little bit. FUEL CELL 2 MAIN A coming OFF. It is. Verify loads balanced; 1 and 3 perfectly balanced. Batteries picked up the load. Okay, CB ECS RAD CONTROL/HEATERS, two, open. RAD CONTROL; they are open. CB RADS HEATERS OVERLOAD, two, open. They're open. WASTE H<sub>2</sub>O DUMP - are open. POTABLE H<sub>2</sub>O HEATER -

11 01 12 34 CMP Off. It's right here.

11 01 12 37 LMP Okay; yeah.

11 01 12 38 CMP GLYCOL TEMP IN to MANUAL.

11 01 12 41 LMP It is. It has been.

11 01 12 42 CMP It has been.

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11 01 12 44 LMP Okay.

11 01 12 45 CDR Okay, now let's put in that thing.

11 01 12 49 LMP GLYCOL TEMP IN -

11 01 12 51 CMP Okay, we do a VERB 25 NOUN 7 ENTER - -

11 01 12 56 CDR ENTER.

11 01 12 57 CMP Seven - 5 - -

11 01 12 58 CDR ENTER.

11 01 12 59 CMP ENTER; 1 -

11 01 13 01 CMP/CDR ENTER; 0 ENTER.

11 01 13 03 CDR Go.

11 01 13 04 LMP I thought it was after you called P61.

11 01 13 06 CDR ... for.

11 01 13 07 CMP Okay, we have knocked down the average g flag.

11 01 13 10 CDR ... 4.

11 01 13 13 CC Roger.

11 01 13 15 CMP Okay, you want to call P61.

11 01 13 17 CDR Let's see now; that's - we're 23 minutes to go.  
Think that's - think that's too much - too long  
for the integration?

11 01 13 24 CMP What's it supposed to be, 18:30?

11 01 13 26 CDR That's ... - -

11 01 13 27 LMP We're supposed to have a flashing 06 61 at 18:30.

11 01 13 31 CMP Want to go at 20?

11 01 13 34 CDR Yeah.

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11 01 13 37 LMP Okay, at 20, it'd be about 290:02, but make it 03.

11 01 13 43 CMP Okay.

11 01 13 52 CMP Well, we've got a - -

11 01 13 53 CDR We got 3 minutes - -

11 01 13 54 LMP Three minutes to go - 4 minutes, actually, John.

11 01 13 55 CDR Yeah.

11 01 13 58 CMP Okay (sigh).

11 01 14 06 LMP Okay, Ken, when we hit the .05G time, I'll - I'll call .05G - time, mark, and remind you of the roll and the .05G switch.

11 01 14 17 CMP All right, sir.

11 01 14 18 LMP Okay?

11 01 14 19 CMP Thank you.

11 01 14 24 LMP Okay, now, down on the flashing 06 61, we got a VERB 21 NOUN 46 has to be set.

11 01 14 30 CMP Yes, sir.

11 01 14 31 LMP Okay. That's after sep - -

11 01 14 33 CMP ... that's - Yeah, that's the next 06 61.

11 01 14 35 LMP Yeah.

11 01 14 58 LMP Okay, horizon check comes up at 290:06:30. ... 15 minutes.

11 01 15 35 CMP That clock is off again.

11 01 16 02 CDR Oh, let's call it up.

11 01 16 04 CMP Okay; go.

11 01 16 08 CDR Agh, we did kill that dang thing.

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11 01 16 13 CMP (Laughter) I wondered if you had enough courage to sit there; I'm not sure I did.

11 01 16 19 CDR Well. Okay, let's check the numbers, Charlie.

11 01 16 23 CMP Minus 000.71. That's good.

11 01 16 26 CDR Yeah.

11 01 16 27 CMP Minus 156.18. That's good.

11 01 16 29 LMP Good.

11 01 16 30 CMP And the heads down. That's good.

11 01 16 31 CDR PRO.

11 01 16 32 CMP PRO.

11 01 16 36 CDR 7.62g's.

11 01 16 37 CMP Oh, shoot.

11 01 16 38 LMP This says 7.1 on the pad.

11 01 16 39 CDR 36188.

11 01 16 41 LMP Okay, this says 36196.

11 01 16 44 CDR Minus 6.68.

11 01 16 46 LMP This says 6.54.

11 01 16 47 CDR Okay.

11 01 16 48 CMP Okay, that - this can change to the integration as you come around.

11 01 16 50 CDR Yeah, we integrated out too far away.

11 01 16 52 CMP Yeah. Go ahead - -

11 01 16 55 CDR ... PRO.

11 01 16 59 LMP 1071.

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11 01 17 00 CDR Okay, 1051. We'll take it.

11 01 17 02 CMP It's close.

11 01 17 03 CDR 36272.

11 01 17 04 CMP Twenty-one minutes to .05G; 23 ... 24 - Yep, that all looks pretty - pretty reasonable. Shall we?

11 01 17 24 CDR Yeah. ... to separate.

11 01 17 28 CMP Okay, that's where we stand by.

11 01 17 30 LMP Okay, at 17 minutes, that's 290:06:31 - 3 minutes from now.

11 01 17 35 CDR Okay, but you probably ought to yaw about 45 degrees now anyway.

11 01 17 37 LMP Yeah.

11 01 17 38 CMP Yeah. Are you ready to do that now?

11 01 17 39 LMP Okay, manual attitude - -

11 01 17 40 CC You're looking good coming up on sep.

11 01 17 42 LMP MANUAL ATTITUDE, three, RATE COMMAND.

11 01 17 45 CMP I have three in RATE COMMAND.

11 01 17 47 LMP ATT DEAD BAND, MIN.

11 01 17 49 CMP DEAD BAND's MIN.

11 01 17 51 LMP RATE, HIGH.

11 01 17 52 CMP RATE's HIGH.

11 01 17 53 LMP SPACECRAFT CONTROL to SCS.

11 01 17 57 CMP SCS.

11 01 17 58 LMP Yaw 45 out.

11 01 17 59 CMP Left?

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11 01 18 00 LMP Left.

11 01 18 02 CMP Okay, my BMAGs are uncaged.

11 01 18 04 LMP BMAGs, ATT 1/RATE 2.

11 01 18 06 CMP Yeah; not until I get out there.

11 01 18 08 LMP Okay; yeah.

11 01 18 28 CMP Verify to STANDBY.

11 01 18 47 LMP We should have a horizon check at 17 minutes also.

11 01 18 50 CMP Okay. That really, I guess, should have been done before I yawed.

11 01 18 56 LMP This is the same time as the yaw.

11 01 18 58 CMP Yeah.

11 01 18 59 LMP Same time as separation, exactly.

11 01 19 01 CDR You can't see the horizon start.

11 01 19 24 CDR Okay, yaw at 45 degrees out of plane.

11 01 19 28 LMP BMAGs, ATT 1/RATE 2?

11 01 19 31 CMP ATT 1/RATE 2.

11 01 19 32 LMP I verify the MAIN BUS TIES are on.

11 01 19 35 CMP Okay. Verify that the GLYCOL was pulled?

11 01 19 38 LMP Okay, verify GLYCOL, BYPASS?

11 01 19 41 CMP That affirm.

11 01 19 42 LMP EMS MODE to STANDBY, verify.

11 01 19 44 CMP That's verified.

11 01 19 46 LMP Okay, the CM RCS LOGIC, on, up.

11 01 19 49 CMP CM RCS LOGIC is on.

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11 01 19 52 LMP Okay, we - -

11 01 19 53 CDR Turn up the lights.

11 01 19 54 CMP Yes, sir. John - -

11 01 19 57 CDR The reason is because you can't see out once we - -

11 01 19 58 CMP Yeah.

11 01 19 59 CDR - - ... in here.

11 01 20 00 CMP Yeah. That's - that's a good plan.

11 01 20 02 CDR Okay.

11 01 20 03 LMP Now we've got 17 minutes. We're coming up - or on 17. We separate at 15, at 290:08:31. We'll hold off on the logic until 17. Okay?

11 01 20 17 CMP The logic?

11 01 20 18 LMP SECS LOGIC, two, on, up, verify.

11 01 20 20 CMP That's verified.

11 01 20 21 CDR Verified.

11 01 20 22 LMP Okay. SECS PYRO ARM, two, to arm at 17. Okay?

11 01 20 24 CMP Okay. And that's coming up in 10 seconds?

11 01 20 27 LMP Ten seconds.

11 01 20 29 CMP Okay.

11 01 20 33 LMP Okay, SECS PYRO ARM, two, arm.

11 01 20 36 CMP Two armed.

11 01 20 37 LMP Okay, at 15, which is 290:08:31, we separate. CM/SM SEP, two, on.

11 01 20 49 CMP This time, John, you can hit any switch up there.

11 01 20 57 CDR ... (laughter).

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11 01 21 00 CMP Just that row.

11 01 21 01 CDR Okay. Tell me when, Charlie, ...

11 01 21 05 LMP I will. We got a minute and a half.

11 01 21 08 CDR Okay, we're a minute and a half to CS/SM [sic] sep.

11 01 21 12 CMP Okay, you got your hand controller locked, but it's armed.

11 01 21 14 CDR It's locked.

11 01 21 15 CMP Okay.

11 01 21 31 LMP We got all the scissors down and everything, didn't we?

11 01 21 34 CMP I sure hope so, Charlie (laughter).

11 01 21 36 LMP Okay, nothing up in here that I see. No screwdrivers or anything - tools. Okay. Within a minute.

11 01 22 02 CDR Should be a loud bang.

11 01 22 05 CMP Man, will it ever.

11 01 22 17 LMP Fifteen seconds, John.

11 01 22 21 CDR Say when.

11 01 22 22 LMP Okay.

11 01 22 31 LMP 3, 2, 1 -

11 01 22 32 LMP SEPARATE. There we go.

11 01 22 34 CMP What's the MASTER ... for?

11 01 22 35 LMP That's just - got to go to caution and warning.

11 01 22 41 CMP Putting them in ... - -

11 01 22 42 LMP Separation, Houston.

11 01 22 44 CC Roger.

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11 01 22 46 LMP Man, it really went, didn't it? MANUAL ATTITUDE, three, MIN IMPULSE.

11 01 22 49 CMP Yeah.

11 01 22 50 LMP BMAGs, RATE 2.

11 01 22 51 CMP RATE 2.

11 01 22 52 LMP C&W mode, COMMAND MODULE; RCS TRANSFER, COMMAND MODULE - -

11 01 22 54 CC ... down here, 16.

11 01 22 55 CMP Go.

11 01 22 56 LMP - - CM RCS LOGIC, OFF. Check - -

11 01 22 59 CMP CM RCS LOGIC is OFF.

11 01 23 00 LMP - - pressures. They're good.

11 01 23 01 CMP Okay. Oh. How's the cabin pressure?

11 01 23 05 LMP Great.

11 01 23 06 CMP Okay.

11 01 23 07 LMP Hanging in there. Batteries are looking good; they picked up all the load. Battery compartment's looking good.

11 01 23 15 CMP I was sure proud to hear that big bang.

11 01 23 17 CDR Me, too.

11 01 23 19 LMP Okay, EMS - Yaw back to zero.

11 01 23 22 CMP Going back.

11 01 23 24 LMP Okay, the bu - bus voltages is hanging super - 28.

11 01 23 27 CMP Boy, there's a lot of stuff out there.

11 01 23 29 LMP Yaw back to ze - Okay?

11 01 23 30 CMP I'm going back to zero, Charlie.

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11 01 23 31 LMP Pitch to entry attitude.

11 01 23 37 CMP Okay, was I supposed to put EMS - -

11 01 23 38 LMP 153.

11 01 23 39 CMP Okay, was I supposed to put the EMS to - NORMAL yet? I mean - -

11 01 23 43 LMP Yeah. EMS data, verify?

11 01 23 45 CMP It's 1051 and 36276.

11 01 23 50 LMP EMS FUNCTION, ENTRY.

11 01 23 53 CMP It's ENTRY.

11 01 23 54 LMP EMS MODE -

11 01 23 55 LMP/CDR NORMAL.

11 01 23 56 CMP NORMAL.

11 01 23 57 LMP Verify the filter down on .05G.

11 01 23 59 CMP That's verified.

11 01 24 00 LMP Okay, when you get to attitude, you can PRO to activate the entry ja - DAP.

11 01 24 05 CMP Okay. No; wait a minute. We're not in attitude.

11 01 24 08 CDR ...

11 01 24 09 LMP We got to pitch to 152.

11 01 24 11 CMP Well, you can PRO on that anyhow. Where - where do we do our thing here?

11 01 24 14 CDR Right here.

11 01 24 15 CMP Between - between these two steps, right?

11 01 24 16 CDR Yeah.

11 01 24 17 CMP Okay.

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11 01 24 18 CDR PRO.

11 01 24 20 CMP It's all right. I'm in SCS, so it's okay.

11 01 24 21 CDR Okay, VERB 21.

11 01 24 25 LMP NOUN 46.

11 01 24 26 CDR 21, NOUN 46.

11 01 24 29 CMP/CDR ENTER.

11 01 24 30 LMP 3000 ENTER.

11 01 24 31 CMP 30,000.

11 01 24 32 LMP 30,000.

11 01 24 33 CMP Okay. There you go. ENTER.

11 01 24 38 LMP Done.

11 01 24 39 CDR Okay, Houston, we have the -

11 01 24 44 CMP ... We're venting something.

11 01 24 45 CDR We have the bit 3 set in 21 46.

11 01 24 50 CC ... you're looking good.

11 01 24 52 CMP We're venting something. Maybe it's the steam duct.

11 01 24 55 CDR Yeah, the water - water boils - -

11 01 24 56 CMP I want to - going to the right and that thing - I looked up again and it turned around and went back to the left.

11 01 24 59 CDR Okay, the water boiling ... it right back. Yeah. Very definitely.

11 01 25 02 LMP Yeah, we're boiling.

11 01 25 04 CMP I didn't remember anyone ever mentioning that. That isn't in the simulator.

11 01 25 07 CDR That doesn't do it very much. Got to be very sensitive.

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11 01 25 09 LMP Okay, 153 on the attitude.

11 01 25 11 CMP Yes, sir.

11 01 25 12 LMP You there?

11 01 25 13 CMP No, no. Keep going (laughter).

11 01 25 15 LMP Okay. Checking them off.

11 01 25 17 CMP Okay.

11 01 25 18 LMP Keeping you honest.

11 01 25 19 CMP That's fair.

11 01 25 24 LMP I nev - I thought I'd see the service module out the side, but it's - never did see it.

11 01 25 29 CDR You want a 06 22?

11 01 25 32 CMP Say again?

11 01 25 33 CDR You want the 06 22?

11 01 25 34 CMP 06 22.

11 01 25 35 LMP When you do that, you get the CMC guidance.

11 01 25 36 CMP Oh, oh.

11 01 25 37 CDR The X-axis is beyond 45 degrees out of velocity vector.

11 01 25 41 CMP I'll probably get that. Go ahead.

11 01 25 54 LMP Didn't get it; P63.

11 01 25 58 CDR Okay, we've got P64 up; she's looking good.

11 01 26 02 CMP 63.

11 01 26 03 LMP 63.

11 01 26 04 CDR 63, I mean.

11 01 26 05 CC Roger; P63.

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11 01 26 07 CDR Scared.

11 01 26 09 CMP Okay, how far are we from EI?

11 01 26 11 LMP Okay, we're at - -

11 01 26 12 CMP Eight minutes?

11 01 26 13 LMP No, we're at 11 minutes.

11 01 26 15 CMP Eleven minutes.

11 01 26 16 LMP And - about 11 minutes and 15 seconds.

11 01 26 18 CMP The horizon will be about - Well, I've already missed the horizon. Okay.

11 01 26 22 LMP Yeah. You can't tell with all those particles out there.

11 01 26 27 CMP What? The horizon's out there?

11 01 26 28 LMP Yeah. I mean what's stars and what's - -

11 01 26 31 CDR It ain't lit.

11 01 26 32 CMP No, the horizon's gonna be ...

11 01 26 33 LMP It ain't lit.

11 01 26 34 CMP Well, when I find the Moon, I'm going to know where the horizon is. It'll be just below it.

11 01 26 40 LMP What's pitch attitude, Ken?

11 01 26 42 CMP We're about 210.

11 01 26 44 LMP Okay.

11 01 26 46 CMP Look - look at that, John. Look how fast that comes down.

11 01 26 51 CDR Yeah, it - it ...

11 01 26 53 CMP You don't have to be too terribly sensitive to see that. That's the first place where the simulator hasn't been just like this thing.

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11 01 27 03 CDR Well, sometimes it - water boils and sometimes it don't.

11 01 27 07 CMP (Laughter) Okay.

11 01 27 14 LMP Okay, at - when we get to 06 64, FDAI SCALE, 5/5.

11 01 27 19 CMP Okay, I - -

11 01 27 20 LMP Okay.

11 01 27 21 CMP I won't be there for a minute. I'll tell you when I get there.

11 01 27 22 LMP Okay, fine.

11 01 27 23 CMP You know, this is the first time we've had particles around us that color. Now I got some red ones and some yellow ones.

11 01 27 32 CDR That's nice.

11 01 27 34 CMP I knew you'd like that.

11 01 27 35 CDR Yeah, I like that, baby.

11 01 27 42 CMP It also takes the pitch out, but it's not as effective as the - the yaw.

11 01 27 53 CDR Come on, baby, hang in there.

11 01 27 54 LMP We've got a zillion particles.

11 01 27 58 CMP Everything looking good so far.

11 01 28 01 LMP Yeah.

11 01 28 10 CMP I do like to hear those things go. Very nice feeling.

11 01 28 16 CDR Six minutes away.

11 01 28 17 CMP Six minutes?

11 01 28 19 CDR About, yeah.

11 01 28 20 LMP No.

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11 01 28 21 CDR Ten ... - -

11 01 28 22 CMP ... - -

11 01 28 23 CDR Ten, yeah.

11 01 28 24 LMP Be 9 minutes.

11 01 28 28 CMP What you got that camera set on, Charlie?

11 01 28 30 LMP I've got it on f/11, just what the checklist says.

11 01 28 32 CMP Yeah.

11 01 28 33 LMP Wh - -

11 01 28 34 CMP I was just thinking - I don't know why I didn't think of this before, but I bet you could get moonset on that thing. Give a little burst as the Moon goes down.

11 01 28 43 LMP Okay. Okay, I'll set it to about 6 frames a second.

11 01 28 51 CMP What - what's it normally on?

11 01 28 52 LMP Twelve.

11 01 28 53 CMP Twelve.

11 01 28 55 LMP Hey, that's a nice red particle out there.

11 01 28 57 CMP Yeah, there's a lot of color.

11 01 29 05 CMP Want another antenna?

11 01 29 08 LMP Houston, 16; our signal strength's down. You want another antenna? Should be a good one. I think they've got groun - ground problems.

11 01 29 23 CC Apollo 16, Houston. We're reading you.

11 01 29 26 LMP Okay, it looks like your up-link's a little weak, Hank; we're down to - we're getting a lot of scratchiness.

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11 01 29 34 CC Roger. We're hearing the same.

11 01 29 37 CDR It's ARIA is what it is.

11 01 29 38 CMP It's - yeah - how about that? They work!

11 01 29 43 LMP What works?

11 01 29 44 CMP ARIA. That wasn't Hank.

11 01 29 46 LMP Yeah, it was.

11 01 29 47 CC ..., 16. We're coming through ARIA now.

11 01 29 49 LMP Yeah, it was. That's Hank.

11 01 29 50 CMP Really?

11 01 29 51 LMP Yeah.

11 01 29 52 CMP ... y'all have heard ... on ARIA.

11 01 29 53 LMP Okay; you sounded pretty good then.

11 01 30 04 LMP Seven g's.

11 01 30 07 CMP (Laughter) It's going to feel it.

11 01 30 08 CDR It's gonna hurt. It really is, I bet you.

11 01 30 14 CMP Yep.

11 01 30 27 CMP Try not to get any surprises. I guess - no one's ever talked about them coming down.

11 01 30 33 CDR No.

11 01 30 34 LMP Don't let any dust get in your eyes; there's a lot floating around here.

11 01 30 36 CC And, Apollo 16, Houston. We do not have telemetry.

11 01 30 41 LMP Okay; we're looking good, Hank.

11 01 30 44 CMP (Laughter) We'll give you our status. I guess they can't get anything through ARIA.

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11 01 31 08 LMP Still don't see the Moon.

11 01 31 10 CMP It won't show up until it - it's moving. It isn't, but we are - moving very rapidly in central angle now.

11 01 31 16 LMP Yeah.

11 01 31 17 CMP And when it comes, it's going to go down - it only takes like a second or two to set.

11 01 31 21 CDR Don't know what - -

11 01 31 24 LMP Okay, we got the attitude yet?

11 01 31 25 CMP Not quite,

11 01 31 26 CDR - - ... what good that does you.

11 01 31 28 CMP What that does for you? If you lose your attitude reference, you can go find the Moon and that just gives you an idea what time that thing ought to set. And then you know where the horizon is. And you can uncage a BMAG there and then pitch 30 degrees and you're - you're near it.

11 01 31 42 CDR Oh, okay. That simple, I'd buy it.

11 01 31 55 CDR 3000 miles to go, gang; 33,971 feet a second, Charlie.

11 01 32 02 LMP 3000 miles to go?

11 01 32 03 CDR Yep.

11 01 32 04 LMP Gyah! We're hauling it. I'll tell you, babe, we're hauling it.

11 01 32 10 CMP We're still accelerating.

11 01 32 13 CDR Yeah, we're starting to pick up speed now.

11 01 32 15 CMP You can feel it go faster.

11 01 32 16 LMP Is that to touchdown - -

11 01 32 17 CMP I feel it - -

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11 01 32 18 LMP - - or is that to EI?

11 01 32 19 CMP - - ... I'm heavy.

11 01 32 20 CDR Huh?

11 01 32 21 LMP Is that 3000 miles to EI?

11 01 32 22 CMP Touchdown - -

11 01 32 23 CDR That's 3000 miles to touchdown.

11 01 32 25 LMP Oh.

11 01 32 28 CDR They always say the - -

11 01 32 29 LMP ... SET is 290 - -

11 01 32 30 CDR - - the last 3000 is the hardest. They don't say it. I just made it up.

11 01 32 37 CMP I see. That's very good.

11 01 32 39 CDR We don't want to come up with any more of those little things.

11 01 32 42 CMP (Laughter) Yeah. I get the last 10,000 feet.

11 01 32 48 LMP We there yet, Ken?

11 01 32 49 CMP (Laughter) No.

11 01 32 51 CDR Well, hurry up.

11 01 32 52 CMP (Laughter) What have we got to do?

11 01 32 57 LMP Well, you got 5 minutes.

11 01 32 59 CMP Okay. I got 10 degrees.

11 01 33 01 LMP Okay, good.

11 01 33 02 CMP What are we going to do when we get here?

11 01 33 03 LMP Just make me comfortable.

11 01 33 04 MS (Laughter)

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Day 12

11 01 33 05 CDR (Laughter) Hang in there. 153 is the attitude.

11 01 33 12 CMP Yes, sir.

11 01 33 14 CDR That's the only thing I know this morning.

11 01 33 17 CMP That's really all you've got to know.

11 01 33 18 LMP We've got a couple of things to do, really; FDAI SCALE and ROT CONTROL POWER.

11 01 33 23 CMP Okay, ROT CONTROL POWER - what are you going to do with that? I got ... - -

11 01 33 25 LMP DIRECT, two, MAIN A/MAIN B.

11 01 33 27 CMP Yeah, I did that before sep.

11 01 33 28 CC ... data back and you're looking good.

11 01 33 31 CDR Roger.

11 01 33 43 SC (Singing) Da-da-da-da.

11 01 33 46 LMP Okay, wind my watch.

11 01 33 49 CMP Yeah, I had to put that on my postsleep checklist because I never remember to wind it. I can't believe - program like this and you got to have a self - can't have a self-winding watch.

11 01 34 02 CDR Digital manpower at work.

11 01 34 06 CMP There's something basic about telling time that - seems to be very difficult. Okay, I'm at attitude, Charlie.

11 01 34 13 LMP Okay. FDAI SCALE, 5/5.

11 01 34 16 CMP Okay, going to 5/5.

11 01 34 17 LMP Okay. Now we just stay hanging in here - until .05G.

11 01 34 30 CMP Okay, and I want to start my wristwatch at .05. I don't know what good that'll do me. I mean at RRT. I'll - I'll set this thing; it just might work. Maybe it'll be sympathetic. It did it on TEI, much to my amazement.

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11 01 34 45 CDR Okay, we got 3 minutes to RRT.

11 01 34 53 CMP Now, the Moon's already set according to this.

11 01 34 56 LMP No, 292 - Yeah, it is - too - I never saw it.

11 01 35 01 CMP No, we weren't in attitude.

11 01 35 02 LMP Okay.

11 01 35 03 CMP We were in attitude for entry, not for watching moonset.

11 01 35 08 LMP Okay, I'm back to 12 frames a second, then.

11 01 35 24 CMP Okay. Okay, all I've got to do is get these guys back to RATE COMMAND and go to CMC, and I'll do that soon as we start to pick up a little aerodynamics.

11 01 35 51 CDR Okay, we're about a minute out.

11 01 35 52 LMP A minute -

11 01 35 53 CMP A minute -

11 01 35 54 LMP/CMP And a half.

11 01 35 57 CDR And ENTRY in NORMAL?

11 01 35 59 CMP Yes, sir.

11 01 36 01 CDR Got both regs on the line?

11 01 36 03 CMP Roger.

11 01 36 04 CDR Pyros are armed.

11 01 36 05 CMP Yep.

11 01 36 06 CDR CM/SM SEP switch - circuit breakers are in.

11 01 36 08 CMP Yep.

11 01 36 10 CDR Think of anything else.

11 01 36 13 CMP I got to get these.

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11 01 36 15 LMP Yeah. Yeah, okay; that's at .05G. You - you also .05G switch and EMS ROLL switch.

11 01 36 22 CMP Okay.

11 01 36 23 LMP Okay, and SPACECRAFT CONTROL - SC MCC [sic]. You got four to get - -

11 01 36 25 CC ..., Houston. You're still looking good.

11 01 36 28 CDR Roger.

11 01 36 33 LMP You're 1 minute out.

11 01 36 41 CDR You might get a little this early because -

11 01 36 45 CMP I think I'm starting to pick up some aero.

11 01 36 47 CDR Yeah, they -

11 01 36 49 LMP That's the horizon. Look at that.

11 01 36 51 CDR Get back in the cockpit, Charlie.

11 01 36 52 LMP Okay.

11 01 36 56 CMP Okay, the needle's coming off the peg. That's doing good work.

11 01 36 58 CDR Yeah, it's right on.

11 01 37 01 CMP Okay.

11 01 37 03 LMP Thirty seconds to RRT.

11 01 37 14 CMP And call at RRT.

11 01 37 17 LMP Okay; 15 seconds.

11 01 37 27 CDR Watch it diverge there.

11 01 37 28 LMP Six seconds, 5 seconds - 2, 1 -

11 01 37 33 LMP MARK; RRT. Watch is started.

11 01 37 35 CMP Clock's running. Okay, I'm going to RATE COMMAND.

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11 01 37 39 LMP And SPACECRAFT CONTROL to CMC.  
11 01 37 43 CDR Better get it back; get that needle back.  
11 01 37 44 LMP Okay, we got some - glow - -  
11 01 37 46 CMP Okay, get your ... Look at the glow.  
11 01 37 48 CDR Give it ...  
11 01 37 49 CMP It's got it. CMC has control.  
11 01 37 50 LMP Okay.  
11 01 37 51 CDR Okay. Hundredth of a g - -  
11 01 37 53 LMP Camera's started.  
11 01 37 55 CMP One - -  
11 01 37 56 CDR 200.  
11 01 37 57 CMP Twenty-three.  
11 01 37 58 CDR Tape [?] four.  
11 01 37 59 LMP .05G -  
11 01 38 00 LMP MARK.  
11 01 38 01 CDR Six, 7 - -  
11 01 38 02 CMP Okay, EMS and .05G ROLL.  
11 01 38 03 LMP Okay.  
11 01 38 05 MS Here we go.  
11 01 38 07 CDR Okay, 0.12g's - -  
11 01 38 08 CMP Beautiful.  
11 01 38 09 CDR 0.17, 0.24, 0.34.  
11 01 38 14 CMP Okay.  
11 01 38 15 CDR 0.5; okay, 0.7.

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11 01 38 19 CMP Coming up on 1 - -  
11 01 38 20 CDR 1.0, 1.3, 2, 2.8 - -  
11 01 38 32 LMP That's just 2?  
11 01 38 33 CMP No, that's 4.  
11 01 38 34 CDR 4.  
11 01 38 38 CMP/CDR 5.  
11 01 38 40 CMP Right on. There's 6.  
11 01 38 42 LMP 6.  
11 01 38 48 CDR 6.9; 7.  
11 01 38 54 CMP It's easing off.  
11 01 38 57 CDR 7. Comp for roll.  
11 01 38 59 CMP Good.  
11 01 39 00 CDR Plus 53.  
11 01 39 01 CMP Circle it.  
11 01 39 02 CDR Plus 90.  
11 01 39 03 CMP Good.  
11 01 39 04 CDR Plus 164.  
11 01 39 05 CMP Outstanding.  
11 01 39 06 MS ...  
11 01 39 08 CMP Doing good work; 5g's.  
11 01 39 11 CDR 5g's; 4.9.  
11 01 39 14 CMP Outstanding machine! Something's on my window.  
11 01 39 20 CDR Guess that's Mylar over there.  
11 01 39 21 LMP Mylar.

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11 01 39 23 CMP 4g's; D<sub>0</sub>.

11 01 39 24 CDR Plus 190, plus 87 -

11 01 39 27 CMP Good work.

11 01 39 28 CDR Plus 53.

11 01 39 29 CMP Fly, you booger.

11 01 39 34 CDR Okay, we're subcirc.

11 01 39 36 CMP Oh, yeah; are we?

11 01 39 37 LMP Yeah; subcirc.

11 01 39 38 CMP My watch is - my - -

11 01 39 39 CDR Comp for plus 1.

11 01 39 41 CMP Okay.

11 01 39 42 LMP And roll.

11 01 39 44 CMP Doing good work, machine. How's the - -

11 01 39 51 CDR - - ... north - -

11 01 39 52 CMP How's the pressures?

11 01 39 53 CDR - - and 11.7 -

11 01 39 55 LMP Pressures are looking good in the RCS.

11 01 39 57 CDR Twenty-five overshoot; 34 overshoot; comp for lift down; 74 degrees right; 75 degrees right.

11 01 40 03 CMP Okay, I'll just copy it, John. No sweat; we are sitting right in here. Beautiful machine. EMS and G&N are converging. We're down to 2-1/2g's.

11 01 40 18 SC (Coughing)

11 01 40 20 CDR Plus 68; plus 69. Reversing roll.

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11 01 40 24 CMP Outstanding.

11 01 40 25 CDR It went - -

11 01 40 26 CMP Good decision.

11 01 40 27 CDR - - 23 north; now it's going back south.

11 01 40 28 CMP Good decision. 82; good show.

11 01 40 32 CDR Okay, what time you got, Charlie?

11 01 40 35 LMP I got 3 minutes -

11 01 40 36 LMP MARK.

11 01 40 37 CDR Okay.

11 01 40 38 LMP We haven't entered blackout yet.

11 01 40 39 CDR Yeah. Ahh.

11 01 40 41 LMP 03:31.

11 01 40 42 CMP Outstanding!

11 01 40 43 CDR Okay, the RCS pressures are looking good. They're at 3000 - -

11 01 40 45 LMP 27:02; we in blackout?

11 01 40 49 CDR Minus 86 - -

11 01 40 50 CMP It's gonna start pulling that range off.

11 01 40 51 CDR Minus 84.

11 01 40 53 CMP It's gonna pull another 4g's here pretty soon.

11 01 40 54 CDR Gonna get another big g here, huh?

11 01 40 56 CMP Yeah.

11 01 40 58 CDR Minus 80.

11 01 41 00 CMP Okay, we -

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11 01 41 02 CDR Minus 77; minus 76 -  
11 01 41 06 LMP Okay, we ... blackout right on time.  
11 01 41 08 CDR Okay.  
11 01 41 09 LMP Got signal strength.  
11 01 41 10 CDR Houston, we're out of the first blackout there.  
11 01 41 15 CMP Okay, the g's are going to be building up again.  
11 01 41 17 LMP Okay.  
11 01 41 22 CDR Minus 50 - -  
11 01 41 23 CMP ... up.  
11 01 41 24 CDR Minus 50.  
11 01 41 25 CMP Fine.  
11 01 41 26 CDR Minus 50; minus 48; minus 48.  
11 01 41 29 CMP Fine.  
11 01 41 30 CDR Minus 48.  
11 01 41 31 CMP Good, good.  
11 01 41 32 CDR Zero down range.  
11 01 41 33 LMP Coming up on - 4 minutes.  
11 01 41 35 CDR Roger; loud and clear.  
11 01 41 37 CMP Okay - -  
11 01 41 38 CDR Minus 49.  
11 01 41 39 CMP Okay, don't bother to read the angles.  
11 01 41 41 CDR Okay.  
11 01 41 43 LMP Okay, passed - we passed 4 minutes.

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11 01 41 45 CMP All right. This thing is almost as smooth as I'd fly it.

11 01 41 52 CDR (Chuckle) Beautiful.

11 01 41 53 CMP I'm glad, mmm. But I'm willing to concede.

11 01 41 58 CDR What's the g's now?

11 01 41 59 CMP Coming up on 3.

11 01 42 00 CDR Okay.

11 01 42 01 CMP You're going to get maybe another half - -

11 01 42 02 LMP 04:30 - -

11 01 42 03 CMP - - and that's about it.

11 01 42 04 LMP MARK.

11 01 42 05 CMP It's doing all the right things. It's gonna have to give you another half a g.

11 01 42 19 CMP Man, that EMS would have gotten home.

11 01 42 22 CDR Isn't that something?

11 01 42 23 LMP Coming up on 5.

11 01 42 26 CDR Reversing.

11 01 42 27 CMP Good show.

11 01 42 28 CDR Supposed to. Man, it hoses it out, I'll tell you.

11 01 42 31 CMP Oh.

11 01 42 32 CDR ... - -

11 01 42 33 CMP You know, I didn't think we were having many g's - -

11 01 42 34 LMP Five minutes.

11 01 42 35 CMP - - until I tried to raise my head (chuckle).

11 01 42 36 CDR Yeah.

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11 01 42 37 LMP Man, 2g's felt like a ton.

11 01 42 39 CMP You're sitting on 3.

11 01 42 40 LMP Okay.

11 01 42 41 CMP ... steady as a rock.

11 01 42 42 CDR Plus 70.

11 01 42 43 CMP Steering looks a champion.

11 01 42 44 CDR Yeah, it looks good.

11 01 42 46 CMP It's gonna dig in a little more.

11 01 42 53 CDR Man, if this don't get you back to one g, nothing will.

11 01 42 55 LMP I know it.

11 01 42 56 CMP Oh, beautiful!

11 01 42 58 LMP Okay, m - on my mark, it'll be 05:30.

11 01 43 02 LMP MARK; 05:30.

11 01 43 16 CMP Okay. Looks to me like that little guy is just gonna do a super job.

11 01 43 21 LMP ...

11 01 43 22 CDR Land us right on the sh - the ship.

11 01 43 27 LMP Okay, coming up on 6 minutes. We should be at 90K momentarily.

11 01 43 31 CMP Okay.

11 01 43 33 CDR Look out, Ticonderoga, we're gonna hit you.

11 01 43 34 LMP Okay, 6 minutes. Steam pressure's not pegging on time.

11 01 43 46 CMP It's not?

11 01 43 47 LMP No.

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11 01 43 51 CMP Okay, I think we're just about to the transonic region.

11 01 43 55 LMP Okay. Okay, there comes the - there comes the steam pressure.

11 01 44 01 CMP P67 - -

11 01 44 02 LMP Gonna be late - late on the steam pressure.

11 01 44 03 CMP/CDR Okay.

11 01 44 04 LMP P67; I'm stopping the DAC. Okay, changing to f/8. Okay, steam pressure's pegged.

11 01 44 14 CDR Okay, we're through 90K.

11 01 44 15 LMP Okay, 90K.

11 01 44 16 CDR Through 90K, Houston.

11 01 44 19 LMP Okay, stand by for 50K.

11 01 44 29 CMP There's a little transonics.

11 01 44 31 CDR/LMP Yeah.

11 01 44 32 CMP That was premature. Okay, I'm off the peg with the altimeter.

11 01 44 36 LMP Okay.

11 01 44 37 CDR Altimeter's off the peg.

11 01 44 38 LMP Give me a call at 50K.

11 01 44 39 CMP Stand by.

11 01 44 40 CDR Go to - go to BOOST/ENTRY - -

11 01 44 41 LMP BOOST/ENTRY.

11 01 44 42 CMP MARK; 50K.

11 01 44 43 LMP BOOST/ENTRY.

11 01 44 44 CMP BOOST/ENTRY on two sides. Okay.

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11 01 44 45 LMP Okay. At 30K, we want ELS LOGIC and ELS, AUTO.

11 01 44 49 CMP Okay. Coming up on 40. That's the relief valves.

11 01 44 57 CMP 40K.

11 01 44 58 LMP Okay.

11 01 45 06 LMP Give me a - -

11 01 45 07 CMP At 35K.

11 01 45 08 LMP Okay.

11 01 45 09 CMP I'll start the camera.

11 01 45 10 LMP I think that's too bright of a setting.

11 01 45 11 CMP Yeah.

11 01 45 12 CDR Okay, get - -

11 01 45 13 LMP Okay, ... - -

11 01 45 14 CMP 30K.

11 01 45 15 LMP Okay, ELS LOGIC; ELS, AUTO - -

11 01 45 16 CMP ... LOGIC and AUTO.

11 01 45 17 LMP Okay, stand by for 24.

11 01 45 20 CMP Standing by. Give it ...

11 01 45 25 LMP There's one.

11 01 45 26 CMP There you go.

11 01 45 27 LMP The APEX COVER.

11 01 45 28 MS There go the drogues.

11 01 45 29 LMP Hang on. They're out. I see two of them.

11 01 45 30 CDR Ohhh, you beauties.

11 01 45 31 LMP Man, are they whopping.

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11 01 45 34 CMP Man, what a ride.

11 01 45 35 LMP Okay, stand by. Okay, BOOST/EN -

11 01 45 38 CMP Huh?

11 01 45 39 LMP Looks like the cabin's coming up.

11 01 45 40 CMP Yeah, I can smell it.

11 01 45 43 LMP Cabin's coming up.

11 01 45 44 CMP Okay. We're stabilizing. You want me to go to BOOST/EN - -

11 01 45 48 LMP No, no. You're okay. Cabin's coming up.

11 01 45 51 CMP Okay. Man, I didn't expect that.

11 01 45 56 LMP Man, those beauties are out there.

11 01 45 58 CMP They are really - must have a load on them. Okay, and the next one I want to get is the mains.

11 01 46 04 LMP Yeah.

11 01 46 07 CDR Roger. Drogues are looking good.

11 01 46 11 CMP Okay, it's gonna drop away and you get two reef - -

11 01 46 13 LMP That's right.

11 01 46 16 CMP Okay, they are - -

11 01 46 17 LMP There they go. There go the mains - -

11 01 46 18 CMP - - ... are out. ... - -

11 01 46 19 LMP MA, O<sub>2</sub> FLOW. Okay, we got three reefed.

11 01 46 23 CMP Okay, stand by - -

11 01 46 24 CDR - - ... is off.

11 01 46 25 LMP Okay, we've dereefed.

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11 01 46 27 CMP I see one - -

11 01 46 28 LMP I see three big ones.

11 01 46 29 CMP - - two, three. They're - now they're dereefed.

11 01 46 31 LMP Now they go. There they go. All three open.

11 01 46 33 CMP Ohhh, beauties.

11 01 46 34 CDR Okay, let's turn off the propellant.

11 01 46 35 CMP Okay.

11 01 46 36 LMP Okay - -

11 01 46 37 CMP Okay, read the checklist.

11 01 46 38 LMP One - 1 second - -

11 01 46 39 CMP Read your checklist.

11 01 46 40 LMP SURGE TANK, O<sub>2</sub>, OFF.

11 01 46 41 CMP SURGE TANK O<sub>2</sub> is OFF.

11 01 46 43 LMP REPRESS PACKAGE, OFF.

11 01 46 45 CMP REPRESS PACKAGE is OFF.

11 01 46 46 LMP I'm going to RECOVERY; A to SIMPLEX, and BEACON is ON. Okay - -

11 01 46 52 CMP ... see that.

11 01 46 53 CDR Recovery, this is Apollo 16.

11 01 46 54 LMP Go to DUMP.

11 01 46 55 CMP DUMP?

11 01 46 56 CDR DUMP.

11 01 46 57 R-1 Apollo 16, this is Recovery. Welcome back; go ahead.

11 01 47 01 CDR Roger. We're showing point - minus 0.72, 156.28 west.

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11 01 47 08 LMP Okay, I'm putting the DAC under the couch.

11 01 47 10 CMP Okay.

11 01 47 11 CDR With a miss of 1.6 miles.

11 01 47 14 LMP Okay, CB FLIGHT/POST LANDING, four, close. Close - three, four, close - -

11 01 47 18 CMP Ah, you beauties.

11 01 47 19 R-1 This is Recovery. Roger; and what's your condition? Over.

11 01 47 20 LMP MAIN A and MAIN B, open - -

11 01 47 23 CDR Outstanding.

11 01 47 24 CMP (Laughter) It's super! Hey, I didn't hear you -

11 01 47 26 ELS Tico, ELS.

11 01 47 27 CMP Charlie, I didn't hear you.

11 01 47 28 ELS Tico, ELS has visual.

11 01 47 29 CMP You're calling off the checklist!

11 01 47 30 TIC Roger.

11 01 47 31 CDR I ain't answering them.

11 01 47 32 LMP It's my side.

11 01 47 33 CMP Okay.

11 01 47 34 LMP Okay.

11 01 47 35 CMP All right.

11 01 47 36 LMP Just get that one to DUMP.

11 01 47 37 CMP Okay.

11 01 47 38 LMP Okay.

11 01 47 39 CDR Let's close these valves.

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11 01 47 40 LMP CM RCS PROPELLANT at 3K. We want those closed.

11 01 47 42 SC (Coughing)

11 01 47 44 S-1 ... Swim's ... visual - -

11 01 47 45 CMP ...

11 01 47 46 LMP That's what I said.

11 01 47 47 CDR Roger.

11 01 47 48 CMP I know, but John didn't want to until 3.

11 01 47 49 CDR Oh, let's get those closed.

11 01 47 51 CMP Okay, we're safe.

11 01 47 52 LMP Okay.

11 01 47 53 R-1 Tico, this is Recovery. Did you receive the Apollo 16 report? All three chutes are fine. They are looking good as they're coming down. Over.

11 01 48 02 TIC Ticonderoga; Roger.

11 01 48 03 CMP Okay, we're coming through 5500, Charlie.

11 01 48 04 LMP Okay; 3K's the next one.

11 01 48 07 TIC Affirmative; copy.

11 01 48 08 CMP Whew! (Cleared throat) That's what I call a thrill.

11 01 48 13 LMP That is something.

11 01 48 14 CDR Isn't that?

11 01 48 15 LMP Say, you can't top that.

11 01 48 18 CMP Isn't that - isn't that something?

11 01 48 20 CDR You gonna bleep the controller?

11 01 48 22 LMP Yeah, that's at 800 feet - -

11 01 48 23 CMP - - ... - -

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11 01 48 24 LMP I'll read it out, okay?

11 01 48 26 CDR We may hit the water at 800 feet.

11 01 48 28 CMP Well, wait a minute. That thing's - -

11 01 48 30 LMP No, we aren't even above the clouds - we're still above the clouds.

11 01 48 33 CDR Well, they don't know what 2000 scattered is out here.

11 01 48 36 CMP Yeah, ...

11 01 48 37 LMP I could see the clouds; they're in the water.

11 01 48 39 CDR (Chuckle) Get you head back in here.

11 01 48 41 LMP (Chuckle) I'm all right. I just want to make sure we don't hit nobody.

11 01 48 45 CDR You're in DUMP, huh?

11 01 48 47 LMP Yeah, one's in DUMP.

11 01 48 48 CMP That certainly is beautiful.

11 01 48 53 P-1 Tico, this is Photo. All main chutes are deployed. There is no sway on the module. It's coming down, straight down.

11 01 48 59 CDR Okay, that's ... - -

11 01 49 00 TIC Roger.

11 01 49 01 CDR - - likely to be in stable I.

11 01 49 03 SC (Coughing)

11 01 49 06 CMP You might think about positioning for landing?

11 01 49 08 LMP I'm - I'm in.

11 01 49 09 CMP ... clips?

11 01 49 11 LMP Well, mine won't work, but my feet are up straight.

11 01 49 14 CMP Okay.

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11 01 49 16 LMP Okay, give me a hack at 3K, Ken.

11 01 49 17 CMP All right; 3200.

11 01 49 19 LMP Okay.

11 01 49 20 CMP Let's call that 3.

11 01 49 21 LMP Okay. PROPELLANT RCM - RCS PROPELLANT, OFF.

11 01 49 24 CMP They're OFF.

11 01 49 25 CDR They're OFF.

11 01 49 26 LMP FLOODs, POST LANDING.

11 01 49 27 CMP FLOODs to POST LANDING.

11 01 49 28 LMP Okay, we wait - -

11 01 49 29 CMP They're on.

11 01 49 30 LMP Okay, we wait until 800.

11 01 49 32 CDR Okay, Houston, we're passing down through 2800 now.

11 01 49 35 CMP Hey, I don't believe that within 500.

11 01 49 37 LMP Helicopter just went right over us.

11 01 49 39 CMP Is that right?

11 01 49 40 LMP Yeah.

11 01 49 41 CDR And we - have the helicopters out the window.

11 01 49 50 CMP Man! Umm! Whew!

11 01 49 53 LMP You just can't describe something like that, that 2g's.

11 01 49 59 CMP Okay, there's 2000.

11 01 50 00 LMP Okay; 800 feet is what we're waiting on.

11 01 50 03 CMP Let's leave - let's leave that one.

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11 01 50 06 CDR Yeah, let's - -

11 01 50 07 CMP I don't want to end up in the water with my dump valve open.

11 01 50 10 CDR Okay, they'll splash in there anyway. You can close them ... Okay, go ahead and do it, Ken.

11 01 50 16 CMP Okay, I'm closing - -

11 01 50 18 LMP What are you supposed to close?

11 01 50 19 CDR I don't know - I don't know if you should close them.

11 01 50 20 CMP Well, you - -

11 01 50 21 LMP Wait - -

11 01 50 22 CDR - - ... gonna get a negative pressure.

11 01 50 23 LMP At 800 feet - Wait - yeah, at 800 feet, close them. We're - we're - there's the helicopter out - -

11 01 50 27 CMP Okay.

11 01 50 28 LMP We're looking good.

11 01 50 29 CMP Okay.

11 01 50 30 LMP Okay, we're still - -

11 01 50 31 ELS Tico, this is ELS. We have the two drogue chutes in sight - -

11 01 50 35 CMP There's 1000.

11 01 50 36 LMP Okay - -

11 01 50 37 ELS - - ... they are due south of the command module.

11 01 50 40 TIC Roger.

11 01 50 41 CMP 900.

11 01 50 42 ELS And up about 3000 feet ...

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11 01 50 44 LMP CABIN PRESS RELIEFs, CLOSE.  
11 01 50 45 CMP Two, CLOSED.  
11 01 50 46 LMP Okay, command - plus or minus yaw for 1 second,  
direct.  
11 01 50 50 TIC Roger.  
11 01 50 52 LMP There you go.  
11 01 50 53 CMP Okay, that's done.  
11 01 50 54 LMP Okay - -  
11 01 50 55 CDR Okay, the yaw has been put in.  
11 01 50 56 LMP - - MAIN BUS TIES coming OFF.

END OF TRANSCRIPT

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